# Aviation Occurrence Reports

89-00254/

# AVIATION OCCURRENCE REPORTS

Cat. No. Tu 2-3/IE

# FOREWORD

## AVIATION OCCURRENCE REPORTS

In accordance with the CASB Act, part of the Board's objective is to report publicly on its investigations, on the related findings, and on any recommendations designed to eliminate or reduce safety deficiencies.

Therefore, this publication, AVIATION OCCURRENCE REPORTS, presents reports on CASB investigations, findings, and recommendations as adopted by the Board. The sole intent in providing this information is to advance aviation safety. It is not the object of the Board to determine or apportion any blame or liability in connection with aviation occurrences.

Anyone wanting to employ the AVIATION OCCURRENCE REPORTS for purposes other than advancing aviation safety could find the information incomplete.

This publication is also available in French.

A limited number of copies of this publication are retained and are available from:

Canadian Aviation Safety Board
P.O. Box 9120
Alta Vista Terminal
Ottawa, Ontario
K1G 3T8

Cette publication est également disponible en français.

On peut obtenir des exemplaires de la présente publication en nombre limité auprès du:

Bureau canadien de la sécurité aérienne
C.P.9120
Terminal Postal Alta Vista
Ottawa (Ontario)
K1G 3T8

This publication contains reports of aviation occurrences, in Canada, involving Canadian or foreign-registered aircraft.

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# EXPLANATORY NOTES

## Types of Reports

The CASB currently produces three types of occurrence reports. The most common format is the Summary Report which summarizes the details of the investigation in one or two pages. The next level is the Intermediate Report which is somewhat longer and more detailed. For both these types, the complete public report is reproduced in this publication. More factual information is available on Summary and Intermediate Reports and can be obtained by contacting the CASB and referencing the report number. Finally, a small number of investigations (generally 15 to 20 per year) result in International Civil Aviation Organization (ICAO) format reports. For the latter type of report, only the Synopsis is included in this publication. The full report can be obtained by contacting the CASB and referencing the report number (which is included with the Synopsis). Laboratory reports, if laboratory analysis has been carried out, are available for all three categories of reports and can be obtained in the same manner.

## Grouping of Reports

For ease of reference, the reports in this publication are grouped by broad category of aircraft type and by type of operation within each group. The reports are then presented chronologically (by the date of the occurrence) within each subgroup.

For fixed-wing conventional aircraft, the first subgroup is Public Transportation. This includes scheduled, other unit toll, and charter operations. Note that this subgroup is further divided into occurrences involving (i) aircraft of 5 700 kg (12,500 lb) or over and (ii) aircraft under 5 700 kg (12,500 lb). The second subgroup is Commercial Training. This includes licensed flying clubs and commercial specialty training (commercial licence classes 6 and 7, respectively). All other types of fixed-wing aircraft commercial operations are grouped under Other Commercial Operations. The Private aircraft subgroup includes all privately registered aircraft, both personal and corporate. It is further subdivided according to type of landing gear. The final subgroup contains occurrences involving state-owned aircraft.

For the rotary-wing category, there are fewer aircraft and fewer occurrences. Thus, only three subgroups are used, viz. Commercial, Private, and State.

The final category contains occurrence reports for all other types. This includes amateur-built aircraft, ultralights, gliders, balloons, etc.

## Contents of Summary Reports and Intermediate Reports

Information on Aircraft:

The first block of each report identifies the type of aircraft involved in the occurrence, the model, the registration, the location, and the date of the occurrence; for commercially operated aircraft, the operator is also identified.

Occurrence Report Number:

The second block commences with the occurrence report number,( any queries to the CASB should carry this reference). The first two numbers identify the year of the occurrence, the first letter identifies the CASB office that conducted the investigation, ('A' - Atlantic, 'Q' - Quebec, 'O' - Ontario, 'C' - Central, 'W' - Western, 'P' - Pacific, 'H' - Head Office). The first number after the letter identifies the year of the decade of the occurrence. This block also contains information on the type of investigation, (a correspondence investigation is one in which the site of the occurrence was not visited by a CASB investigator) the time of the occurrence, the type of operation, the extent of damage to the aircraft, and the type of licence held by the pilot.

Pilot Hours:

This block indicates the total number of hours the pilot had acquired on all types of aircraft, the total number of hours on type, and the number of hours flown in the last 90 days (in total and on type).

Injuries:

The injuries sustained by the crew, passengers, or others are classified as Fatal, Serious, or Minor/None (See Definitions).

Summary Report Narrative:

The narrative summarizes the history of the flight, pertinent factual information and analysis. The narrative is divided into two parts:

(a) the factual information or a description of what happened, which begins with a description of the history of the flight as close as possible to the occurrence, followed by the pertinent information; and

(b) an analysis of why the occurrence happened.

Findings:

The Board's findings from an investigation are grouped under two subheadings, as follows:

Cause-Related Findings: Any element of the occurrence, found during the investigation which, if removed, would have prevented the occurrence, or, if removed, would have avoided or reduced damage to property and people.

Other Findings: Information, discovered during the investigation of an occurrence, which is not cause related but has the potential to enhance or degrade aviation safety.

Safety Action:

For all aviation occurrence investigations, relevant data are recorded to facilitate statistical analysis and the identification of system-wide safety deficiencies through safety studies. In cases where an individual occurrence investigation leads to specific CASB action, such as an Aviation Safety Recommendation, that action is included in the public report immediately after the Findings.

# DEFINITIONS

(Extracted from the Canadian Aviation Safety Board Act/Regulations)

"AVIATION OCCURRENCE"

(a) any accident or incident associated with the operation of aircraft, and

(b) any situation or condition that the Board has reasonable grounds to believe could, if left unattended, induce an accident or incident described in paragraph (a).

"ACCIDENT"

"ACCIDENT" means any aviation occurrence where, at any time during the period commencing when the first person boards an aircraft for the purpose of flight and ending when the last person disembarks from the aircraft after the flight,

(a) a person other than a stowaway, sustains a serious injury or fatal injury, that is not self-inflicted or inflicted by another person or caused by natural causes, as a result of that person

  i) being in the aircraft,

  ii) coming in direct contact with any part of the aircraft, including any part that may have become detached from the aircraft, or

  iii) being directly exposed to the jet blast of the aircraft,

(b) the aircraft sustains damage or structural failure adversely affecting the structural strength, performance or flight characteristics of the aircraft and normally requiring major repair or replacement of any affected component part, other than damage or failure that is limited to

  i) the engine, its cowling, or its accessories,

  ii) the propellers, wing tips, antennae, tires, brakes or fairings, or

  iii) small dents or puncture holes in the aircraft skin, or

(c) the aircraft is missing or is completely inaccessible.

"SERIOUS INJURY"

"SERIOUS INJURY" means an injury that is sustained by a person in an accident and that

(a) requires hospitalization for more than 48 hours, commencing within seven days from the date the injury was sustained,

(b) results in a fracture of any bone, other than a simple fracture of the nose or of any fingers or toes,

(c) involves lacerations that cause severe haemorrhage or nerve, muscle or tendon damage,

(d) involves injury to any internal organ, or

(e) involves second or third degree burns, or any burns affecting more than five per cent of the body surface.

"INCIDENT"

"INCIDENT" means an aviation occurrence, other than an accident, that affects or could affect the safe operation of an aircraft. Incidents can be reported to the CASB through mandatory or voluntary reporting mechanisms.

According to the CASB regulations a "reportable incident" means any incident involving an aircraft with a maximum certified take-off weight greater than 5 700 kg where

(a) an engine fails,

(b) smoke or fire occurs, other than an engine fire that is contained within the engine and does not result in engine failure or damage to other component parts of the aircraft,

(c) difficulties in controlling the aircraft in flight are encountered due to any aircraft system malfunction, weather phenomena, wake turbulence, operations outside the approved flight envelope, or uncontrolled vibrations,

(d) the aircraft fails to remain within the intended landing or take-off area, lands with one or more landing gear retracted, or drags a wing tip or engine pod,

(e) any crew member is unable to perform his flight duties as a result of incapacitation,

(f) decompression, explosive or otherwise, occurs that necessitates an emergency descent,

(g) a fuel shortage occurs that necessitates a diversion or requires approach and landing priority at the destination of the aircraft,

(h) the aircraft is refuelled with the incorrect type of fuel or contaminated fuel that is undetected prior to departure from the ramp,

(i) a collision or risk of collision with any other aircraft or with any vehicle, terrain or obstacle occurs, including a collision or risk of collision that may be related to air traffic control procedures or equipment failures,

(j) a flight crew member declares an emergency or indicates any degree of emergency that requires priority handling by an air traffic control unit or the standing by of crash, fire fighting or rescue services, or

(k) toxic gases or corrosive materials leak from any cargo aboard the aircraft.

BUSINESS AIR SERVICES
GATES LEARJET 25B C-GRCO
LONDON AIRPORT, ONTARIO
30 NOVEMBER 1983

REPORT NUMBER: 83-034074 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0920 EST
OPERATION: Charter
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20,000 | 3,500 |
| LAST 90 DAYS | 70 | 70 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

Following a straight-in, very high frequency omni-directional range approach in poor visibility caused by blowing snow, the aircraft overran the 6,300-foot snow-covered runway. When it came to rest 100 feet beyond the end of the runway, all three landing gear wheels bogged down in the soft ground.

When the aircraft crossed the threshold with excessive speed and height, it was not aligned with the runway. However, the crew elected to land, aligned the aircraft and landed on the slippery runway 3,755 feet in from the threshold. As a result, there was not enough runway remaining on which to stop the aircraft.

FINDINGS:

Cause Related:

1. The aircraft crossed the runway threshold with excess airspeed and height.

2. The aircraft was not aligned with the runway until it was beyond the threshold.

3. The aircraft landed and ran off the runway.

Other:

-- Nil --

16/10/85

NORDAIR LTD.
BOEING 737 C-FNAQ
LESTER B. PEARSON INTERNATIONAL AIRPORT, TORONTO, ONTARIO
22 JANUARY 1984

REPORT NUMBER: 84-044007 (Incident)
LOCAL TIME: 1700 EST
OPERATION: Scheduled
DAMAGE: None
PILOT LICENCE: N/A

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | N/A | N/A |
| LAST 90 DAYS | N/A | N/A |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During the flight, a flight attendant reported that a toilet would not flush and the pump was noisy. After landing, routine servicing was carried out, but the toilet still would not flush.

Maintenance personnel replaced the timer and the pump, and the toilet operated normally. This timer had been removed from service a month before because the toilet would not flush. The timer was repaired by the company's avionics shop and reinstalled in the aircraft on 02 January 1984. Previous maintenance had been completed on the pump; in July 1982, it had been repaired because it was noisy and was installed in the aircraft on 26 December 1983.

The flush pump system components were sent to the laboratory for analysis. Investigation determined that one of the three microswitches in the timer had failed, which caused one phase of the three-phase pump motor to remain energized following the completion of the flush cycle. This in turn caused the flush pump motor to overheat to the extent that it could not be handled with bare hands. The flush pump and motor were not damaged. There was no thermal protection on the pump motor. Because of the nature of the failure, the circuit-breakers associated with the pump system, did not trip.

Approximately one month prior to this incident, a bulletin was issued to all Boeing 737 operators advising them of the availability of a thermal protection kit for the pump motor. This kit had not yet been installed on this aircraft.

The following laboratory report was completed: LP 37/84 - Lavatory Pump, Timer and Circuit-Breaker.

.../2

18/03/86

FINDINGS:

Cause Related:

1. A microswitch failure caused the flush pump motor to remain partially energized which caused it to overheat.

Other:

1. The flush pump motor did not have thermal protection.

SAFETY ACTIONS:

Actions Taken:

Safety concerns for the adequacy of electrical and thermal protection for lavatory flush pump motors on passenger aircraft have resulted in the following:

1. Some airline and aircraft manufacturers have changed the electrical value of the circuit-breakers for the flush pump motor circuit;
2. The FAA required the rerouting of the lavatory wiring harness in specific aircraft;
3. The Department of Transport now requires a daily functional check of the flush pump motor on all aircraft not incorporating a thermal protection device;
4. Some subcontractors and aircraft manufacturers issued service bulletins recommending the installation of a thermal protection kit on the flush pump motors.

Despite the actions already taken by the airlines, the manufacturers, and the Department of Transport, the Canadian Aviation Safety Board considered that further action was required to mitigate the safety hazard deriving from inadequate thermal protection for the lavatory flush pump motor system.

Tests conducted on these pump motors have indicated that certain failure modes can cause significantly elevated temperatures on the motor case without tripping the related circuit-breakers in the three-phase electrical supply.

Therefore, in order to further reduce the chance of an overheating flush pump motor starting an onboard fire or necessitating an emergency descent and landing, the Canadian Aviation Safety Board has recommended that:

> The Department of Transport issue an Airworthiness Directive that will require mandatory installation of a thermal protection device on all flush pump motors not already so equipped in all transport category airplanes.

(CASB 85-16)

Further Action Required:

The CASB will monitor action on this recommendation.

18/03/86

AIR ONTARIO LIMITED
CONVAIR 340/31 C-GDTC
LESTER B. PEARSON INTERNATIONAL AIRPORT, TORONTO, ONTARIO
18 APRIL 1984

REPORT NUMBER: 84-044022 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1630 EDT
OPERATION: Scheduled Domestic
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | Unknown | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 4 |
| PASSENGERS | - | - | 55 |

SUMMARY REPORT:

The aircraft was descending to land when it was struck by lightning. As they were unaware of the extent of the damage, the flight crew requested immediate descent at a reduced airspeed for a straight-in approach. The aircraft landed without further incident.

Examination of the aircraft revealed that both the left and right wing tips had been damaged by the lightning strike.

At the time of the occurrence, weather radar indicated a line of convective cells in the area with embedded cumulonimbus clouds topped at 16,000 to 20,000 feet.

FINDINGS:

Cause Related:

1. The aircraft entered an area of cloud embedded with cumulonimbus clouds.

2. The aircraft was struck by lightning.

Other:

-- Nil --

16/10/85

LABRADOR AIRWAYS LIMITED
SAUNDERS ST-27 C-FCNT
ST JOHN'S AIRPORT, NEWFOUNDLAND
28 MAY 1984

REPORT NUMBER: 84-A40011 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1900 NDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES<br>CAPTAIN/CO-PILOT | ON TYPE<br>CAPTAIN/CO-PILOT |
|---|---|---|
| TOTAL | 2,650 / 2,400 | 750 / 25 |
| LAST 90 DAYS | 275 / 100 | 270 / 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 3 |
| PASSENGERS | - | - | 5 |

SUMMARY REPORT:

The aircraft departed St. Anthony, Newfoundland for St. John's, Newfoundland on the last leg of a regularly scheduled flight. During an en-route descent, the crew heard or felt a muffled bang and observed that the gear unsafe light had come on. A short while later the first officer, who was flying at the time, noticed that the aircraft tended to yaw to the right. This condition lasted for a few minutes and then corrected itself.

The flight continued on to St. John's and was given clearance for a straight-in approach to runway 16. As the aircraft crossed the beacon inbound to final, the crew selected the landing gear down. It was then observed that only the right main gear and nose gear showed a green, safe and locked indication. The left main gear still indicated unsafe. The captain then decided to try a touch-and-go to see if he could jar the gear into a locked position. After two attempts, the captain asked the tower to check his landing gear. The tower reported that the gear appeared to be down, but they could not tell if it was locked. A pilot in an aircraft waiting for take-off clearance reported that the left main gear appeared to fold inwards.

The mechanical landing gear indicator, a metal flag protruding through the upper surface of the wing, indicated to the pilot that the left landing gear was retracted, while the right main gear was down and locked. The captain saw that the left gear was extended and swinging freely from side to side. The captain flew several low passes so that the company engineer could visually check the landing gear. The engineer noticed that the lower side stay was broken and hanging down freely.

.../2

After burning off fuel and consulting with company officials, the pilot decided to land, wheels down, on the grassy area between runway 20 and the hangar line tarmac. The captain feathered the left engine on final, touched down, raised the flaps, and used reverse on the right engine to hold the left wing up as long as possible. As the left wing dropped, the aircraft swung around to the left through 160 degrees and came to a stop.

The investigation revealed that the damper lever jack, the main jack, and the lever stay link of the left gear assembly failed in overload prior to the emergency landing. The cause of the failures could not be determined.

The following laboratory reports were completed: LP 192/84 - Pneumatic Jack
LP 193/84 - Fracture Analysis

FINDINGS:

Cause Related:

1. The left landing gear actuating system failed in overload for undetermined reasons.

Other:

- Nil -

18/12/85

INUVIK COASTAL AIRWAYS LTD.
DE HAVILLAND DHC-6-200 C-FGJK
PAULATUK AERODROME, N.W.T.
17 DECEMBER 1983

REPORT NUMBER: 83-W30065 (Accident)
LOCAL TIME: 1310 MST
OPERATION: Charter
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20,000 | 6,000 |
| LAST 90 DAYS | Unknown | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | 10 |

SUMMARY REPORT:

The flight from Inuvik to Paulatuk was conducted under visual flight rules (VFR). As the aircraft approached to land on the airstrip in an easterly direction, the wind increased appreciably from the south. Witnesses on the ground stated that just before touchdown, the aircraft disappeared from view in blowing snow, and very shortly thereafter, increased engine noise was heard. When the aircraft failed to taxi in, local residents drove to look for it and discovered the wreckage about 300 feet north of the runway.

The investigation revealed that as an overshoot was initiated, the left wing tip was dragged along the tops of snowdrifts. The aircraft travelled in this condition for several hundred feet, changing its heading by about 80 degrees before it cartwheeled. The nose section was demolished to the forward cabin bulkhead, both wings were separated, and the tail section was crushed forward as the fuselage slid backward on its belly. The main cabin area remained relatively intact. Examination of the wreckage including the engines and the flight controls revealed no pre-impact failures or malfunctions in any of the aircraft systems.

Unpredictable rapid changes in weather are common along the Arctic coast and there are few weather reporting stations. During the weather briefing at Inuvik, the pilot could not obtain a weather report for Paulatuk because the reporting station has limited hours of operation. The area forecast was generally for clear weather with patches of ice fog; wind was not emphasized for the Paulatuk-Cape Perry area. However,

.../2

Inuvik was expected to remain clear and the pilot was advised that Cape Perry, 60 miles north of Paulatuk, was also reporting clear conditions. The actual surface wind at Paulatuk during the afternoon of the occurrence was extremely variable. Witnesses, both on the ground and aboard the aircraft, agreed that the visibility was reduced to zero as the aircraft touched down. Snow was being blown across the strip by gusty winds estimated at 25 to 30 knots.

The pilot, who held a valid instrument rating, was experienced on the aircraft type and knew the environment in which he was flying. However, conditions changed so rapidly, that an almost instantaneous transition from a visual landing to an instrument overshoot was necessitated. Difficulties in the overshoot were compounded by the cross-wind and the fact that the aircraft was approximately 840 pounds over allowable gross weight for landing. The centre of gravity was within the prescribed limits. Calculations showed that the aircraft would have been at its legal landing weight if the fuel load had been reduced to that required for the flight plus 45 minutes reserve. No up-lift of fuel was planned because it was not readily available.

The location of the runway was based upon terrain suitability and construction costs rather than on a study of prevailing winds and needs of the village. The unlicensed aerodrome is operated by the Government of the Northwest Territories. Since 1979, the community and local aircraft operators have pressed for changes and improvements. In December 1981, the Arctic Airport Site Selection Committee stated that Transport Canada would be developing an Arctic 'C' Airport at Paulatuk in 1984/85. However, the program lapsed before the construction could begin. As the strongest winds tend to blow from the north or south, a corresponding runway orientation was recommended, as was a change in location to accommodate expansion of the community.

The following laboratory report was completed: LP458/83 - R/H Aileron Rod End.

FINDINGS:

Cause Related:

1. The Paulatuk aerodrome runway is not oriented to correspond with the prevailing winds.

2. Environment Canada does not produce an aerodrome forecast for Paulatuk.

3. As the aircraft landed, the cross-wind from the right increased appreciably reducing visibility in blowing snow.

4. During the overshoot, as the pilot was making the transition from visual to instrument flight conditions, control of the aircraft was lost.
5. The aircraft was overloaded.

Other:

-- Nil --

## RECOMMENDATIONS

### Action Taken

No urgent safety action or interim recommendations were initiated by the Canadian Aviation Safety Board (CASB) as a consequence of this accident.

### Further Actions Required

### Adequacy of Facilities at Arctic Aerodromes

The Board notes that many northern landing strips are rudimentary and have been developed with only local resources. In a 1978 Memorandum of Understanding (MOU) between several federal government departments and the governments of the territories, standards for the identification and upgrading of northern aviation facilities were prescribed. The MOU expired in March 1983, at which time there were a number of facilities which had been identified as qualifying for upgrading or replacement, but for which implementation of the projects had not been completed. A more appropriately oriented runway for Paulatuk was one such project.

A similar situation was noted during the CASB's investigation of a Twin Otter accident in 1984. The Board determined that proposed improvements for Fort Franklin, N.W.T., identified under the terms of the MOU, had not been completed. CASB Recommendation 85-11 sought minimal essential improvements in air-ground-air communications facilities and weather reporting services which were not completed when the Arctic Air Transportation Facilities Policy expired.

The CASB is concerned that the inadequacy of aviation facilities at many arctic community aerodromes may be compromising aviation safety in northern operations. Therefore, the Board is reviewing the circumstances from recent occurrences at such aerodromes with a view to possibly making formal recommendations regarding the requirement to re-identify sub-standard facilities and to develop a program to upgrade or replace any safety deficient facilities.

### Runway orientation at Paulatuk

The CASB is concerned that the orientation of the runway at Paulatuk constitutes a severe operating limitation on pilots operating in and out of the airport. For many years the aviation community of the western arctic has expressed concern about the adverse runway and weather conditions which can be encountered at Paulatuk. These conditions and the increased use of the aerodrome strongly influenced the decision by officials of the Department of Transport to recommend construction of a new runway from which operations could be conducted more safely. It is acknowledged that the runway is primarily used by aircraft operators who are aware of prevailing weather conditions, and that the level of service provided by the locally employed weather observers is adequate for such a small community. Nevertheless, given the documented concerns about Paulatuk, the Board believes that information pertaining to the strong, unpredictable cross- winds which are regularly experienced at that aerodrome should be disseminated to all possible users of the facility. Accordingly, until a new runway which favours the prevailing wind direction is constructed at Paulatuk, the CASB recommends that:

The Department of Transport amend the Canada Flight Supplement to include an advisory note in the airport listing for Paulatuk which would indicate that pilots may regularly expect adverse cross-wind conditions on approach and landing.

(CASB-85-28)

## Aircraft Operating Beyond Weight and Balance Limitations

The CASB is concerned that commercially operated aircraft continue to be flown with an apparent disregard for the weight and balance limitations of the aircraft, often with loads inadequately secured to prevent movement in flight or during impact deceleration. During the period from 1976 through 1984 there were at least 40 such accidents with 78 fatalities and 26 serious injuries.

As a consequence of an accident involving a DC-3 at Lester B. Pearson International Airport, the CASB issued Recommendations CASB-85-01 and 02 to the Department of Transport which suggested measures to help prevent accidents resulting from weight and balance problems. The CASB notes that the Minister has responded positively, indicating plans for a national aviation safety campaign which will involve air carrier inspectors, enforcement inspectors and safety promotions staff. In view of these recommendations and the positive measures undertaken by the Department of Transport, the CASB is not issuing similar recommendations in conjunction with this report. However, the Board is continuing to review and analyse accidents involving aircraft flown outside the limitations of weight and balance, and further recommendations may be forthcoming.

HARBOUR AIR LTD.
CESSNA 185F C-GYJF
PITT RIVER, BRITISH COLUMBIA
20 DECEMBER 1983

REPORT NUMBER: 83-P30082 (Accident)
LOCAL TIME: 0930 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1720 | 800 |
| LAST 90 DAYS | 140 | 105 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The float-equipped aircraft had been chartered to fly 3 passengers to a log boom in the Pitt River. On departure from the river just after lift-off the aircraft rolled to the right. Full left aileron could not stop the roll. The aircraft struck the water in a right-wing down, nose-low attitude, and nosed over; it remained afloat inverted. The occupants did not don the life vests, but they were able to escape and remain on the floats.

The temperature at the time of the accident was -7°C and the weather was clear. During pre-flight, it was noted that the controls of the aircraft were free to move, and the wings were free of ice, but ice had accumulated on the wing struts because of water taxiing.

The exact nature of the uncontrollable roll was not determined, but a possible cause was airframe ice accretion.

FINDINGS:

Cause Related:

1. Undetermined.

Other:

1. The aircraft was inverted and the occupants did not don the life vests.

DATE: 9/05/85

ORCA AIR LTD
DHC-2 BEAVER CF-RQW
PORT MCNEILL, BRITISH COLUMBIA
30 DECEMBER 1983

REPORT NUMBER: 83-P30084
LOCAL TIME: 1135 PST
OPERATION: Non-regular Specific Point
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3000 | 125 |
| LAST 90 DAYS | 120 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

The pilot and four passengers were commencing a flight from Port McNeill harbour. During take-off the aircraft struck several large waves, nosed over and came to rest inverted. The pilot assisted the passengers in their escape, by opening the left fuselage door from the outside. He was concerned that the passengers would not be able to open the door because the bench seat installation in the aircraft interferes with the operation of the fuselage door handle. The aircraft remained afloat long enough for survivors to cling to it, until rescued twenty minutes later by boat. None of the occupants managed to don life vests. Some passengers had not been briefed on life vest location and donning methods.

The aircraft began its take-off in a relatively sheltered area behind a breakwater. The wind was gusting to 25 knots and blowing against a strong tidal flow producing large swells in open water areas. It was expected that the aircraft would get airborne prior to encountering the rougher water, but the take-off run was longer than anticipated.

Investigation determined that the aircraft take-off weight was at least equal to the maximum allowable. In addition, this aircraft had a slow leak in the left float, that required daily removal of water. Reportedly the float had been pumped out on the day of the occurrence, about two hours prior to departure. It likely contained some water, adding to aircraft weight. Study of the take-off area used and DHC-2 performance data showed that, with similar weather conditions, rough water would be encountered prior to getting airborne, assuming the take-off was made at the maximum allowable weight.

.../2

DATE: 09/05/85

SLATE FALLS AIRWAYS LTD.
CESSNA 180J C-GEQH
LAC SEUL, ONTARIO
2 JANUARY 1984

REPORT NUMBER: 84-C44001 (Incident)
INFORMATION SOURCE:
LOCAL TIME: 1200 CST
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2780 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

Following touch-down and during the landing roll, the ski-equipped aircraft settled onto the tip of its right wing when the right main gear leg failed. The component failed in an instantaneous brittle overload rupture in the presence of small fatigue pre-cracks. The fatigue area had multiple initiation sites associated with corrosion pits on the surface of the brake line bracket dimple on the inside face of the gear leg.

The following laboratory report was completed: LP 38/84.

FINDINGS:

Cause Related:

1. The right main gear failed in instantaneous overload in the presence of fatigue pre-cracks.

Other:

- Nil -

19/09/85

QUEBEC AVIATION LTD
BEECHCRAFT 99 C-GPFF
QUEBEC AIRPORT, QUEBEC
01 FEBRUARY 1984

REPORT NUMBER: 84-Q44006 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1747 EST
OPERATION: Regular Specific Point
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7,500 | 1,000 |
| LAST 90 DAYS | 245 | 233 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 12 |

SUMMARY REPORT:

During the climb-out, the pilot heard an unusual sound being emitted from the left engine. He then noticed numerous sparks coming from the exhaust stacks; he reduced power and returned to the airport of departure.

A preliminary examination of the engine by a company engineer revealed extensive foreign-object damage in the compressor section. This section was removed and forwarded to an overhaul facility. During the subsequent dismantlement, a fragment of a washer was discovered inside the gas generator case. The fragment could not be identified nor could its origin be established.

It is likely that the washer fragment was the cause of the unusual engine noise and the sparks.

FINDINGS:

Cause Related:

1. There was extensive foreign-object damage to the compressor section.
2. A washer fragment of unknown origin was discovered inside the gas generator case.
3. The fragment was most likely the cause of the unusual engine noise and the sparks.

Other:

- Nil -

06/08/86

AVIATION QUÉBEC LABRADOR LTÉE
BEECHCRAFT 18, C-FFTB
SEPT ILES, QUEBEC
06 FEBRUARY 1984

REPORT NUMBER: 84-Q40007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1545 EST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS:(1st officer) | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4 210 | 370 |
| LAST 90 DAYS | 130 | 74 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the approach for landing, the captain had his seat positioned fully aft. The first officer, who occupied the left hand seat, was flying the approach to runway 09 in a 15 kt cross-wind from the left. The aircraft touched down on a bare and dry portion of the runway, but when the tail came down, the aircraft yawed and drifted towards the edge of the runway, which was coated with ice and snow. Even with the full application of aileron, rudder and brake, the aircraft continued to drift until the left wing and engine contacted a snowbank beside the runway. The aircraft swung around and entered the snowbank.

On landing, this type of tail wheel aircraft is prone to yawing when the tail comes down. A cross-wind increases this tendency. In addition, the icy patches on the runway made the brakes less effective for directional control. Under these conditions, the application of aileron, rudder and brake, without the use of differential power, was not sufficient to maintain directional control.

The captain was unable to assist the pilot during the landing roll. As his seat was positioned fully aft, he could not reach or operate the controls.

.../2

FINDINGS:

Cause Related:

1. Directional control was not maintained during the cross-wind landing.

2. The captain had his seat in the fully aft position and could not reach the controls. He therefore could not assist the pilot with the landing.

Other:

- Nil -

19/09/85

AIR B.C.
CESSNA A185F, C-GZXH
ACTAEON SOUND, BRITISH COLUMBIA
13 MARCH 1984

REPORT NUMBER: 84-P40007 (Accident)
LOCAL TIME: 1045 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4800 | 1300 |
| LAST 90 DAYS | 160 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

Reportedly, before the amphibious aircraft (Edo 579-2790 amphibious floats) landed, the undercarriage selector was in the "up" position, the warning lights indicated "up", and the left float main wheel indicator showed the gear was retracted. Just after touchdown the left float dug in causing a swerve to the left. The pilot pulled back on the control column and applied full right aileron; the aircraft rolled to the right and the right wing struck the water, tearing off about three feet of the outboard section. When the machine was taxied to the dock, the left main wheel appeared to be partially extended. The gear extended fully and locked in place when the pilot selected it down to taxi up a gravel ramp to the beach.

Several functional checks of the undercarriage system were conducted but no failures or malfunctions were found. At no time during testing, while electrical power was supplied to the system, would either undercarriage remain in a partially extended position. At the time of occurrence all circuit breakers were in and the battery master was on. The aircraft had had several gear-related unserviceabilities, but all had been rectified and none would account for the partial extension of the main gear.

.../2

DATE: 09/05/85

FINDINGS:

Cause Related:

1. For undetermined reasons the main gear was not fully retracted during a water landing.

Other:

- Nil -

DAWN AIR
CESSNA A185F, C-GYFW
SOUTH END, SASKATCHEWAN
27 MARCH 1984

REPORT NUMBER: 84-C40019 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1620 MST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 200 |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

While the ski/wheel-equipped aircraft was on final approach, several witnesses observed that the right ski tip was pointing down. Just prior to landing, the passenger noticed the abnormal ski-angle, but did not have time to tell the pilot. Following touchdown, the aircraft nosed over.

The right ski front bungee attachment failed for undetermined reasons prior to landing. The ski was in a lower than normal attitude limited by the front check cable. On touchdown, the right main landing gear ski-axle flange failed allowing the gear leg to drag in the snow and the aircraft to nose over. An examination of the landing area indicated that the right ski did not dig in on touchdown.

The ski-axle flange failed because of the overload extension of low cycle, high-stress fatigue pre-cracks. The fatigue surface was five per cent of the fracture area. Corrosion was a likely factor in the initiation of the fatigue cracking. There was evidence that the final loading was somewhat greater than normal, which could have been the result of increased loading from the misaligned ski.

The following laboratory report was completed: LP 150/84 - Wheel-Ski Axle.

.../2

19/9/85

C40019

FINDINGS:

Cause Related:

1. The right landing gear ski-axle flange failed as a result of overload.

2. The ski-axle flange was weakened by fatigue pre-cracks which was probably initiated by corrosion.

Other:

1. The right ski front bungee attachment failed for undetermined reasons prior to landing.

19/09/85

PINE HOUSE AIRWAYS
CESSNA 185F C-GYHJ
HALL LAKE, SASKATCHEWAN
06 APRIL 1984

REPORT NUMBER: 84-C40021 (Accident)
LOCAL TIME: 1020 MST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7000 | 2500 |
| LAST 90 DAYS | 30 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

As the pilot approached Hall Lake he checked the landing area and noticed that there were snow-drifts on the ice-covered lake. After an assessment that the drifts were not too large, the pilot commenced to land.

Upon touchdown the left gear struck a frozen drift and broke off. This caused the wing and propeller to strike the snow-covered lake. The tail wheel pulled out of the rear bulkhead and the left-hand horizontal stabilizer was also damaged. The aircraft came to rest upright 75 ft from the initial impact area.

Warm temperatures on the previous day, followed by below freezing during the night, caused the drifts to melt, then freeze.

FINDINGS;

Cause Related

1. The aircraft's left main gear struck a frozen snow drift upon landing.

2. The lake surface area chosen for landing was unsuitable.

Other

- Nil - 19/09/85

KEEWATIN AIR SERVICES LTD.
DE HAVILLAND DHC-2 C-GAKA
SAND LAKE, NORTHWEST TERRITORIES
30 MAY 1984

REPORT NUMBER: 84-C40029 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1500 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,550 | 1,000 |
| LAST 90 DAYS | 128 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

Following touchdown on a dirt strip, the aircraft contacted a rough spot and bounced. The pilot applied power to overshoot, and the aircraft mushed, bounced, and drifted to the left striking an empty oil drum which was used as a strip marker. The pilot closed the throttle and brought the aircraft to a stop just beyond the landing area.

The airstrip, which is a 1,500-foot long section of an esker, is marked off with 45-gallon drums. The surface condition of the strip was very rough at the time of the occurrence.

The pilot reported that although he had selected partial flap for the landing, he noticed that they were in the full-down position after the accident. The pilot felt that the flaps had bled down after the bounce, preventing a successful recovery.

Examination revealed no system defects and the flaps functioned normally during a subsequent ferry flight. As the flap system operated normally, it is unlikely the flaps bled down in flight as the pressure created by airflow around the wings would have prevented them from extending from their selected position; however, it is normal for the flaps on the Beaver to bleed down after the aircraft has been shut down. This would account for the position in which they were found.

As there was no evidence of pre-occurrence mechanical or structural deficiencies, it was concluded that during the go-around, the airspeed was allowed to decay to the point where controlled flight could no longer be maintained.

.../2

21/11/85

FINDINGS:

Cause Related:

1. The surface condition of the airstrip was very rough resulting in a bounced landing.
2. Sufficient airspeed to sustain flight was not maintained during the recovery from the bounced landing.

Other:

- Nil -

21/11/85

THORBURN AVIATION LTD.
CESSNA A185F C-GUCA
TERRINGTON BASIN, NEWFOUNDLAND
01 JUNE 1984

REPORT NUMBER: 84-A40012 (Accident)
LOCAL TIME: 0955 NST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,500 | 6 |
| LAST 90 DAYS | 6 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

The pilot of the float-equipped aircraft taxied across Terrington Basin and aligned the aircraft into the wind for the take-off. During the take-off run and shortly after reaching the "step", the pilot rejected the take-off. The aircraft continued on to the shore and nosed over.

The pilot had not flown fixed-wing aircraft for about two years and had flown about six hours since receiving his check-out on float-equipped aircraft.

Terrington Basin is a U-shaped body of water. The take-off area selected was about 2,000 feet long and was at one of the narrowest parts of the basin. The pilot rejected the take-off after using about 1,600 feet of the available area. An into the wind take-off area of 6,000 feet or more was available to the pilot in another area of the basin.

FINDINGS:

Cause Related:

1. The pilot lacked recent flying and float-flying experience.

2. The pilot selected an unsuitable area for take-off.

Other

- Nil -

22/04/86

NAHANNI AIR SERVICES LTD.
CESSNA 402, C-GZVM
FORT FRANKLIN, N.W.T.
14 JUNE 1984

REPORT NUMBER: 84-W40036 (Accident)
LOCAL TIME: 1205 MST
OPERATION: Regular Specific Point
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 11000 | 60 |
| LAST 90 DAYS | 200 | 60 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

Following a normal approach and touchdown the aircraft began to swerve to the right. The pilot applied opposite rudder and brake but was unable to regain directional control. The aircraft slid sideways off the right side of the runway, causing a complete gear collapse.

Investigation revealed that the right main gear torque links had separated and the top link lodged between the brake housing and tire. This resulted in the tire toeing out about 20° which in turn caused the aircraft to swerve to the right.

The procedure for assembly after repair or replacement of the main gear calls for a steel bushing to be inserted through the ends of the torque links then a 5/16th in bolt through the bushing. Under the head of the bolt, and under the nut, two special washers are required. Sometime prior to this accident the special washers were replaced with ordinary ones of nearly the same dimension. This allowed the bushing, still secured by the nut, to work loose and come out of the torque link.

.../2

DATE: 09/05/85

When or why the improper washers were installed could not be confirmed through a review of records and discussion with maintenance personnel. However, a new right wing had been affixed to the aircraft and the original landing gear reinstalled two years before the occurrence, prior to the company purchasing the aircraft.

FINDINGS:

Cause Related:

1. Washers of the wrong type and dimension for the torque link connecting bolt were installed.

2. The bushing in the torque link worked loose; the torque links separated allowing the main gear to turn.

3. The upper torque link jammed between the brake housing and tire, resulting in toe-out sufficient to cause an uncontrollable swerve.

Other:

-- Nil --

AIR CANADA
BOEING 767 C-GAUH
DORVAL AIRPORT, QUEBEC
18 FEBRUARY 1983

REPORT NUMBER: 83-Q34012 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1027 EST
OPERATION: Commercial Non-Revenue
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20,625 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 3 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Prior to departing on a training flight, the captain noticed an intermittent unsafe indication of the left overwing emergency door. The take-off was rejected and the tower controller was asked to take a look at the aircraft. When the controller indicated that he could not see a problem, the captain suspected a false warning and taxied back for take-off. During the roll and climb-out, an intermittent unsafe indication was again experienced. Upon reaching 2,000 feet, the intermittent warning became a steady warning which coincided with an airframe vibration. The aircraft was returned to Dorval Airport, and, after landing, it was noticed that the emergency chute door was open and that the passenger slide was missing.

The investigation revealed that, because two similar aircraft experienced in-flight slide deployments, Boeing issued a Service Bulletin 767-25-5 dated 07 December 1982. Although Boeing was unable to identify the cause at the time, the Bulletin emphasized the requirement to inspect for correct seating of a locking pin and to rerig the integrator cables if required.

After three additional incidents were reported to Boeing, Boeing issued service bulletin 767-25-15 on 24 February 1983, which introduced the incorporation of an additional locking device as a back-up in case the original integrator locking pin should fail.

FINDINGS:

Cause Related:

1. The flight was continued despite the intermittent unsafe door indications.

2. The left overwing emergency chute door became unlatched and opened in flight.

3. Because of the design of the emergency chute door latching device, the door was prone to unlatching.

Other:

- Nil -

06/08/86

LAKEHEAD FLYING SCHOOL LTD
PIPER AZTEC PA23-250, C-FWSK
DOG LAKE, ONTARIO
18 JULY 1983

REPORT NUMBER: 83-C30073 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0938 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | | ON TYPE | |
|---|---|---|---|---|
| | INSTRUCTOR | TRAINEE | INSTRUCTOR | TRAINEE |
| TOTAL | 912 | 290 | 153 | 1 |
| LAST 90 DAYS | 128 | 17 | 39 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 2 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot trainee, accompanied by a flight instructor, took off for an initial multi-engine training flight. The aircraft climbed to 5,000 feet and a series of medium and steep turns and some slow flight was carried out. The next exercise was a power-off stall. Stall entry was normal; however, as the throttles were moved forward to increase power during the recovery, both propellers went into the feathered position.

Unable to restart the engines, the instructor pilot carried out a forced landing in a densely wooded area. The aircraft cut a descending swath for 200 feet through the trees. The cockpit and cabin area escaped significant damage, but the rest of the airframe was extensively damaged.

The engines and propellers could not be lifted out until two months after the accident because all the available helicopters in the area were involved in fire-fighting operations. Once removed, they were delivered to the owner's hangar, and there the propellers were removed and reinstalled before they could be examined by authorized investigators. A technical examination of both engines and propellers failed to reveal any cause for the reported power plant failure. It is not known if the unauthorized removal of the power plants resulted in any loss of evidence.

.../2

02/04/86

It is possible that if the pitch controls were not in the full fine position during the stall, there might have been insufficient oil pressure to counteract air pressure, thereby allowing the propellers to move to the feathered position.

To unfeather the propellers and restart the engines in flight, it is necessary, in addition to other steps, to turn the electric fuel pumps to the "off" position and place the throttle to the one-half-inch open position. During the restart attempt, the fuel boost pumps were left on and the throttles were placed about in the mid-position. This likely resulted in the engines being flooded. Also, the airspeed was increased to 100 mph about 30 mph less than that recommended to obtain a windmilling propeller. Therefore, it was concluded that the engines failed to restart because the recommended emergency procedure was not followed in its entirety.

FINDINGS:

Cause Related:

1. During a power-off stall, both propellers went into the feathered position for undetermined reasons.
2. The incorrect emergency procedure used prevented a successful restart of the engines.
3. The aircraft was force-landed in a densely wooded area resulting in substantial damage to the aircraft.

Other:

1. The propellers were removed and reinstalled before they could be examined by authorized investigators.

02/04/86

MONCTON FLYING CLUB
PA-38 C-GBIC
MONCTON AIRPORT
11 AUGUST 1983

REPORT NUMBER: 83-A34008 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1405 ADT
OPERATION: Flying Club Training
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 900 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The student was practising simulated engine-out landings. Just prior to touchdown, the instructor warned the student that the airspeed was decreasing. The student immediately lowered the nose, even though the aircraft was only a few feet above the runway. Before the instructor could react, the aircraft touched down heavily on the nosewheel. The aircraft then veered off the runway, and the propeller struck a runway light.

An examination revealed that the hard landing caused the nose gear steering mechanism to break, which resulted in a loss of nosewheel steering.

FINDINGS:

Cause Related:

1. The student pilot over-reacted when he was cautioned about the airspeed.

2. The instructor had not anticipated that the student pilot would lower the nose of the aircraft when close to the ground.

3. The hard landing caused the steering actuator arm to break, which resulted in a loss of nosewheel steering.

Other:

- Nil -

06/08/86

CAPITAL FLIGHT TRAINING
PIPER PA-38-112, C-GNRC
UCLUELET, BRITISH COLUMBIA 2 MI NNE
15 JANUARY 1984

REPORT NUMBER: 84-P40002 (Accident)
LOCAL TIME: 1415 PST
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 82 | 81 |
| LAST 90 DAYS | 25 | 24 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft, fueled to capacity, departed Victoria for Tofino. About 40 minutes after take-off, the pilot switched the fuel selector from the left tank to the right. A few minutes later it was noticed that the electric turn indicator warning flag had appeared and both electric fuel gauges showed a substantial drop in quantity. They continued to drop at a rate of approximately 2 gallons per minute. A slow descent was initiated and a precautionary landing area sought because it was believed that the aircraft was losing fuel. Attempts to contact Tofino Radio met with no response and activation of the aircraft radio test switch produced no sound of static.

One fuel gauge needle was in the red when the aircraft approached for landing on a section of logging road. Following a normal touchdown, the left wing-tip struck a tree, the aircraft swung to the left, and the right main gear collapsed. The aircraft slid sideways along the road and into a ditch. Later, during salvage, 8 gallons of fuel were drained from the right tank and 16 gallons from the left.

Investigation revealed that the alternator power cable attachment lug had fractured and separated from the terminal post. The failure was due to galvanic corrosive action, resulting from contact between the copper lug and the steel post fittings; this contact was likely precipitated by the use of an unplated

.../2

DATE: 09/05/85

mounting nut and washer. The separation of the lug resulted in a loss of power to the aircraft battery, thereby rendering all electrical systems inoperative. According to log-book entries, the alternator had not required maintenance or been removed since aircraft manufacture. The manufacturer specifies that the mounting nut and washer be plated. It could not be determined whether the unplated nut and washer were installed during manufacture or maintenance.

FINDINGS:

Cause Related:

1. The alternator power cable attachment lug failed due to galvanic corrosion.
2. The lug had been secured by an unplated mounting nut and washer, contrary to manufacturer specifications.
3. Resultant loss of battery power rendered all the aircraft electrical systems inoperative.
4. When the electrical system failed, the electric fuel gauges indicated a progressive loss of fuel.
5. The electrical failure was not recognized so fuel quantity indications were believed to be accurate.
6. A precautionary landing was carried out on a logging road because of perceived imminent aircraft fuel exhaustion.

Other:

- Nil -

CHAPMAN AVIATION LIMITED
CESSNA 172M CF-DLI
ARNPRIOR/SOUTH RENFREW MUNICIPAL AIRPORT, ONTARIO
22 JANUARY 1984

REPORT NUMBER: 84-044006 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1600 EST
OPERATION: Flying School Training
DAMAGE: Minor
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 52 | 17 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The student pilot was practising take-offs and landings on the 2,500-foot snow-covered runway. On this landing attempt, the aircraft landed about 800 feet beyond the threshold. It overran the runway and struck a snowbank. The nosewheel collapsed, and the aircraft nosed down.

The braking action on the snow-covered runway was poor and as a result, the pilot was unable to stop the aircraft on the remaining runway.

FINDINGS:

Cause Related:

1. The snow-covered runway provided poor braking action, and under the existing runway conditions, the long landing did not leave enough runway on which to stop.

Other:

-- Nil --

18/12/85

SERVICES AÉRIENS PERFECAIR INC.
CESSNA 172N C-GVHN
MASCOUCHE AIRPORT, QUEBEC
28 MARCH 1984

REPORT NUMBER: 84-Q40012 (Accident)
INFORMATION SOURCE: Field investigation
LOCAL TIME: 1305 EST
OPERATION: Specialty Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 40 | 11 |
| LAST 90 DAYS | 14 | 14 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Following a three-hour solo cross-country flight, the student pilot carried out an approach to the home airport in a 15-to-20-knot, 40-degree cross-wind from the left. On touchdown, the aircraft bounced, drifted right and touched down on the shoulder of the runway. The aircraft rolled parallel to the runway and hit a marker. It continued to roll to the end of the runway where the nosewheel entered a depression and the aircraft partially nosed over.

The bounce was the result of an excessive rate-of-descent which was induced by either the student pilot or the variation in the wind intensity. The student pilot lost control of the aircraft on landing and did not take appropriate corrective action. After the three-hour flight, the pilot was experiencing fatigue which degraded her reactions during landing.

FINDINGS:

Cause Related:

1. The high rate-of-descent at touchdown caused the aircraft to bounce.

2. The cross-wind pushed the aircraft off the runway.

3. The student pilot lost control on landing and did not take appropriate corrective action.

4. The pilot's reactions were degraded by fatigue.

Other:

- Nil -

19/09/85

COLLISION BETWEEN: CESSNA 172P C-GSPV and
CESSNA 150L C-GEAC
TRAIL, BRITISH COLUMBIA 2 mi N
LOCAL TIME: 1150 PST
29 MARCH 1984

## CESSNA 150 C-GEAC

REPORT NUMBER: 84-P40801 (Accident)
INFORMATION SOURCE: Field Investigation
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 339 | 310 |
| LAST 90 DAYS | 7 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

## CESSNA 172 C-GSPV

SELAIR PILOTS ASSOCIATION
REPORT NUMBER: 84-P40802 (Accident)
OPERATION: Flying Club Training
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | | ON TYPE | |
|---|---|---|---|---|
| | INSTRUCTOR | TRAINEE | INSTRUCTOR | TRAINEE |
| TOTAL | 4,786 | 102 | 3,500 | 59 |
| LAST 90 DAYS | 190 | 32 | 190 | 32 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 2 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Two aircraft collided while flying at about 5,000 feet in clear weather two miles north of the city of Trail. During the collision, the left landing gear of the Cessna 150 damaged the right wing of the Cessna 172. The wing failed and the Cessna 172 went into an out-of-control vertical dive. The Cessna 172 was destroyed on impact, and both occupants were killed. The Cessna 150 returned safely to its departure aerodrome.

.../2

28/05/86

The crew of the Cessna 172 had departed from the Castlegar Airport, intending to practise forced landings using the Trail Airport. On board were a flying instructor and a pilot undergoing training for a commercial licence. The Cessna 172 reported clear of the Castlegar control zone to the south. The collision occurred about three minutes later while the Cessna 172 was wings-level on a southerly heading.

The Cessna 150 had also departed from Castlegar Airport, five minutes before the Cessna 172. The purpose of the flight was to practise steep turns and forced landings in an area south of Castlegar. The pilot of the Cessna 150 reported clear of the Castlegar control zone and then contacted Castlegar Flight Service Station, reporting that he would be in the practice area for about the next hour at four to six thousand feet. At the time of this radio transmission, the crew of the Cessna 172 was using a different radio frequency and was not aware of the intentions of the Cessna 150.

The pilot of the Cessna 150 was conducting a series of steep turns. After rolling out of a steep right turn, the pilot checked his instruments to gauge the accuracy of his heading control and then looked up and saw the Cessna 172 directly in front of him, coming toward him. The Cessna 172 flew underneath the Cessna 150 and the Cessna 150 pilot felt a jolt and heard a "bang". The pilot of the Cessna 150 looked back and thought the Cessna 172 was still flying in level flight, but then he lost sight of the other aircraft. The Cessna 150 made a radio call to determine if the other aircraft had been damaged, but no reply was received. The pilot of the Cessna 150 then returned to Castlegar and decided to carry out touch-and-go training. During the landing roll, the aircraft was vibrating badly, and the pilot brought the aircraft to a full stop. The tower controller advised the pilot that his left landing gear was damaged and inquired whether the Cessna 150 had been flying near the location of the crash of the Cessna 172. The pilot replied that he had been in the area.

The pilots of the two aircraft did not observe each other in time to avoid the collision. The Cessna 150 was likely obscured to the crew of the Cessna 172 as it came from the direction of the sun. In addition, because of the type of training being conducted by the crew of the Cessna 172, it is likely that they were looking down at possible forced-landing sites. While the pilot of the Cessna 150 was carrying out a steep turn, it would have been difficult for him to see the Cessna 172.

.../3

FINDINGS:

Cause Related:

1. The crews of the Cessna 150 and the Cessna 172 did not observe each other in time to avoid a collision.

2. The Cessna 172 crashed when its right wing failed after being struck by the left landing gear of the Cessna 150.

Other:

-- Nil --

28/05/86

CALGARY FLYING CLUB
PIPER PA 28-140 C-GMSU
COCHRANE, ALBERTA 9 mi N
21 APRIL 1984

REPORT NUMBER: 84-W40025 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0845 MST
OPERATION: Specialty Flying Training
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 198 | 198 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

A short time after the pilot had departed on a local training flight, a resident heard a loud propeller noise followed by a "pop". When the resident looked outside he saw wreckage in a field approximately 200 yards from his residence.

Examination of the accident site indicated that the aircraft had struck the ground in a near-vertical attitude at a high speed. The aircraft bounced forward 10 feet and came to rest in an inverted position. The examination failed to disclose any pre-impact mechanical discrepency. The stabilator trim jack indicated that the aircraft was trimmed for cruise flight.

The crushed exhaust system and the damaged instruments were forwarded to the laboratory for closer examination. The exhaust system was checked to determine if there was any carbon monoxide (CO) leakage and to ascertain the exhaust system temperature at impact. It was determined that there was no indication of CO leakage, but the attempts to ascertain exhaust temperature were unsuccessful. The examination of the airspeed indicator revealed an airspeed of about 190 to 195 knots.

The pilot had recently complained of chest pains and dizzy spells, but had not reported these problems either to his family doctor or to a Department of Transport designated doctor. The autopsy results were inconclusive, but there is a possibility that the pilot became incapacitated and lost control of the aircraft.

.../ 2

28/05/86

The following laboratory reports were completed: LP 148/84 - Examination of Instruments, and LP 147/84 - Exhaust System Analysis.

FINDINGS:

Cause Related:

1. Control of the aircraft was lost for undetermined reasons.

Other:

- Nil -

28/05/86

BRAMPTON FLYING CLUB
CESSNA 172 M, C-GPJC
COOKSTOWN, ONTARIO 4MI SW,
22 APRIL 1984

REPORT NUMBER: 84-040016 (Accident)
LOCAL TIME: 1710 EST
OPERATION: Flying Club Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 140 | 139 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was landing on a grass field used by ultralights. As the nosewheel was lowered onto the grass, it dug into the ground and the aircraft came to rest inverted.

On the day before the accident the pilot had inspected the field on foot and from the air. Before landing the pilot again overflew the field but was unaware of the poor field condition at about the center of the airstrip.

FINDINGS:

Cause Related:

The soft area of the field was not noted by the pilot during his inspection.

Other:

-- Nil --

19/09/85

BRAMPTON FLYING CLUB
CESSNA 152 C-GQSY
BRAMPTON AIRPORT, ONTARIO
28 APRIL 1984

REPORT NUMBER: 84-040802
LOCAL TIME: 1230 EST
OPERATION: Flying Club Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 47 | 47 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The Cessna was taxiing to the button of runway 32 for take-off when unicom advised that due to a wind shift runway 26 was not in use. The pilot was about to cross runway 32 to proceed to the active runway when he noticed a Beech Bonanza landing. Although he stopped on the runway edge the Bonanza's left wing struck the Cessna damaging the nose cowl and left wing.

Although local traffic had been advised by Unicom of a change in the active, the Bonanza pilot did not hear this information due to his unserviceable radio. For the same reason he was unsuccessful in transmitting to other aircraft, his intention to use runway 32. The Cessna pilot was unaware of the traffic on final until it had landed and was too close to avoid.

FINDINGS:

Cause Related

1. The radio of the landing aircraft was unserviceable.
2. The Bonanza pilot was unaware of the change of runway in use.
3. The pilot of the Cessna was unaware of the intentions of the landing aircraft.
4. The Cessna pilot did not see the landing aircraft in time to avoid a collision.

DRAFT NO: 2
DATE: 09/12/84
HQ ANALYST: H23

Other

- Nil -

AERO TRANSMISSION LTD.
PIPER PA 28-140 C-GBBM
ST. JEAN AIRPORT, QUEBEC
4 JUNE 1984

REPORT NUMBER: 84-Q40027
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1930 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 63 | 63 |
| LAST 90 DAYS | 32 | 32 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was attempting a touch-and-go landing on the 3,400-foot runway. The descent was started high and close to the threshold, thus requiring a steep approach. One thousand feet past the runway threshold, the nosewheel contacted the runway first and the aircraft started to porpoise. It continued to porpoise until the pilot applied power to stabilize the aircraft. The pilot then landed the aircraft with 800 ft of runway remaining. During the landing roll, the pilot contemplated whether to continue the touch-and-go or to stop the aircraft. With 100 ft of runway remaining, the pilot applied full brakes. The aircraft then continued on to the grass overrun and entered a deep uncontoured ditch adjacent to the graded area.

The flare at touchdown was not sufficient to prevent the nose gear from contacting the runway. As a result, a porpoise motion developed. Once the pilot had stabilized the aircraft, he delayed the decision to reject the touch-and-go until the aircraft had approached the end of the runway. As a result, the aircraft overran the runway and entered a ditch.

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19/09/85

FINDINGS:

Cause Related

1. The approach was initiated from a point that required a steep descent to the runway.

2. The aircraft was not sufficiently flared for touchdown.

3. The aircraft porpoised after the nose gear contacted the runway.

4. The pilot delayed his decision to reject the touch-and-go and stop the aircraft.

5. The aircraft overran the runway and entered a ditch.

Other

1. The drainage ditch does not meet the requirements as described in Transport Canada's TP 312, Chapter 10, concerning runway strips graded areas.

19/09/85

t
PIPER PA-28, C-GQER
REGINA, SASKATCHEWAN
17 JUNE 1984

REPORT NUMBER: 84-C40036 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0902 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 55 | 18 |
| LAST 90 DAYS | 14 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

The aircraft took off from Saskatoon and an hour later was cleared to join right base for runway 26 at Regina Airport. Approximately two miles north of the field at circuit altitude, the engine stopped. Unable to restart the engine, the pilot carried out a forced landing on to a nearby golf course. Just before landing, he noticed a drainage ditch on the course and tried to stretch the glide. The aircraft stalled just beyond this ditch and landed hard causing the nose and right main gear to fail.

The investigation did not reveal any fault with the fuel system or the engine. There was no evidence of fuel leakage from either tank. The right fuel gauge read zero and the tank was found empty. The left fuel tank contained 10 gallons.

On departure the right tank reportedly contained 11 to 12 gallons and the left 8 to 9 gallons. This quantity was considered to be sufficient for the flight; only the right tank was used during the trip. In normal cruise, the rate of fuel consumption for this aircraft is nine gallons per hour. Therefore, taking into account ground handling, take-off, and fuel gauge inaccuracies, the fuel in the right tank was depleted on the approach to Regina.

.../2

02/04/86

While approaching the airfield, the pre-landing check-list was performed except for the fuel check. When the engine stopped, the pilot carried out the engine failure check-list, but the left tank was not selected in time to prevent a forced landing. There were indications that the pilot was tired and was in a hurry to complete the flight.

## FINDINGS

### Cause Related:

1. The fuel supply was not monitored en-route nor during the pre-landing check.
2. The engine lost power because of fuel starvation when the fuel in the right tank was depleted.
3. The left tank was not selected in time to prevent a forced landing.
4. While avoiding a ditch during the forced landing, the aircraft stalled, which resulted in a hard landing and damage to the aircraft.

### Other:

- Nil -

02/04/86

CARGAIR LTÉE
DEHAVILLAND DHC-2 CF-ZKU
OBEDJIWAN, QUEBEC
14 JUNE 1983

REPORT NUMBER: 83-Q30037 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1600 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,600 | 4,000 |
| LAST 90 DAYS | 100 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The float plane was circling to land close to a dock. About 175 feet above the water, a steep left turn was made on to short final. When the turn was completed, the pilot realized he was too close to the shore and banked abruptly to the left to avoid colliding with the dock. The left wing tip contacted the water, and the aircraft cartwheeled. The float plane then inverted and sank. The floats, wings, propeller and engine were damaged.

Although the pilot felt that the wind was from the northwest at 10 to 15 mph and that he had made the approach into wind, two witnesses on the ground, one a licensed pilot said that the aircraft landed with a tail wind.

The evidence indicates that the pilot misjudged the wind direction and that the tail wind caused the aircraft to drift closer to the intended landing area during the turn on to final. The pilot did not allow sufficient distance to align the aircraft for a landing close to the dock.

FINDINGS:

Cause Related:

1. The wind was misjudged and a landing close to the dock was attempted.

2. The pilot did not allow sufficient distance to align the aircraft for the landing.

Other:

-- Nil --

06/08/86

SKYCRAFT AIR TRANSPORT INC.
DOUGLAS DC3C C-GUBT
TORONTO INTERNATIONAL AIRPORT, ONTARIO
22 JUNE 1983

REPORT NUMBER: 83-030045 (Accident)
LOCAL TIME: 0858 EDT
OPERATION: International Charter
DAMAGE: Destroyed
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,404 | 1,167 |
| LAST 90 DAYS | 233 | 59 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 2 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was flying from Cleveland to Toronto International Airport, on the third leg of a trans-border cargo flight.

When approaching to land at Toronto, and after crossing the runway threshold, the aircraft entered a series of pitch oscillations, then stalled and struck the ground beside the runway in a flat attitude. A fire followed. Both crew members perished in the crash.

The aircraft's weight and centre of gravity limits were exceeded, and the cargo was not secured. These factors led to a loss of control of the aircraft.

NOTE: A full report is available on request.

DRAFT NO: 2
DATE: 08/03/85
HQ ANALYST: H11/A05

AIR B.G.M. INC.
PIPER PA34-200 C-GUJL
PARENT AIRPORT, QUEBEC
23 AUGUST 1983

REPORT NUMBER: 83-Q34069 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1215 EDT
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | Unknown | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After take-off, as power was being reduced to climb setting, pieces of the left propeller spinner dome assembly separated from the mounting. Pieces hit the fuselage and fell on to the runway. The flight continued to its destination without further incident.

The pieces of the spinner that were recovered from the runway and removed from the aircraft were submitted for laboratory analysis. It was determined that the propeller dome check nut had been installed backwards, thus creating an excessive clearance between the spinner and the low pitch stop. This clearance allowed sideways flexing at the forward mounting point of the spinner, which, in turn, caused wear and further enlargement of the spinner mounting holes. When the spinner assembly worked loose, 150 hours after installation, fatigue cracking of the spinner aft bulkhead resulted. Then, because of centrifugal forces, the spinner aft bulkhead failed and shifted outwards. The centrifugal forces and airloads caused the spinner skin to tear and separate from the propeller assembly.

The investigation was unable to determine why the propeller dome check nut had been installed backwards. Two different manufacturer's drawings depicting the propeller assembly were obtained, each carrying the same title and issue date but having different content. Neither drawing clearly depicted the correct installation of the check nut.

.../2

19/09/85

FINDINGS:

Cause Related:

1. The dome check nut was installed backwards.
2. The fatigue cracks at the spinner aft bulkhead resulted from flexing of the forward spinner mounting.
3. The pieces of the spinner separated from the aircraft because of centrifugal forces and airloads.
4. The Piper PA34 maintenance manual does not clearly depict the assembly procedure.

Other:

1. Two different drawings of the propeller assembly exist, each carrying the identical title and issue date.

19/09/85

ORCA AIR
DE HAVILLAND DHC-2, C-FJOM
PORT McNEILL, B.C.
24 DECEMBER 1983

REPORT NUMBER: 83-P30083
LOCAL TIME: 1330 PST
OPERATION: Non-Regular Specific Point
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7800 | 2500 |
| LAST 90 DAYS | 80 | 80 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

On arrival at Port McNeill, the wind was out of the southeast at 25 gusting to 35 kts. A cross-wind landing to the northeast was carried out rather than a landing into the wind and heavy swells. The aircraft touched down in an area sheltered by vessels. When it rolled out into the open area strong winds were encountered, the right wing lifted, the left float dug into a swell, and the aircraft overturned.

The aircraft was off the step, travelling at low speed when it nosed over. Damage was confined to salt water immersion until the aircraft washed against a breakwater where the wings and tail surfaces were pounded.

FINDINGS:

Cause Related:

1. A landing was attempted in wind and water conditions which combined to overturn the aircraft.

Other:

- Nil -

DATE: 09/05/85

EDMONTON FLYING CLUB
CESSNA 172B, C-GMES
ST. ALBERT AIRPORT, ALBERTA
11 FEBRUARY 1984

REPORT NUMBER: 84-W40007 (Accident)
LOCAL TIME: 1700 MST
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 74 | 6 |
| LAST 90 DAYS | 12 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The aircraft had been rented for a visual flight from Edmonton Municipal Airport to the Cooking Lake area. Near Cooking Lake, it was noticed that the aircraft electrical system had failed. The pilot decided to divert to St. Albert airport and land on runway 07. Approaching downwind, the throttle was closed and the engine failed. An attempt was then made to carry out a straight-in approach on runway 25. The aircraft landed past the runway in a snow covered field. On landing the nose wheel broke off, the aircraft nosed-over and came to rest inverted.

Investigation determined that the electrical system failed because of a broken alternator field wire. The wire diameter was less than specified by the manufacturer; the wire had failed due to fatigue.

The weather conditions at the time of the accident were conducive to carburettor icing. Moisture was found in the carburettor venturi which was likely a result of icing. Another pilot, flying in the same area, reported severe carburettor icing. Although it was reported that carburettor heat was used prior to closing the throttle, it is possible the engine stopped because of carburettor icing.

.../2

DATE: 09/05/85

During the forced landing, the electrical failure prevented the use of flaps and no S-turns or side-slips were made to lose excess altitude.

The pilot had limited experience. He had obtained his private pilot licence only 2 months prior and had flown 11 hours since that time.

FINDINGS:

Cause Related:

1. The electrical system failed because of a broken alternator field wire.
2. The wire diameter was smaller than specified by the manufacturer and had failed due to fatigue.
3. On approach to the diversion airport the engine stopped; possibly because of carburettor icing.
4. A forced landing on the airport was commenced from a position above the power-off glide path.
5. Flaps could not be used for drag because of the electrical failure.
6. Other methods such as S-turns and side-slips to lose excess height were not employed.
7. The aircraft landed beyond the runway in snow and nosed-over.
8. The pilot was faced with a multiple emergency that exceeded the capabilities of his limited experience.

Other:

- Nil -

AERO TRANSMISSION LTD.
CHAMPION 7ECA C-FDDO
LONGUEUIL, QUEBEC
24 FEBRUARY 1984

REPORT NUMBER: 84-Q40010 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1215 EST
OPERATION: Specialty Aerial Advertising
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,934 | 13 |
| LAST 90 DAYS | 40 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was returning for a landing from an aerial advertising flight. With the banner still in tow, the pilot reported his position to the tower and was cleared to descend for an approach to runway 06 left. About 3 miles west of the airport, the engine stopped. The pilot declared a Mayday and directed his aircraft towards a vacant lot. He released the banner at about 450 feet above ground level. As a result, the rate of descent was reduced, and the aircraft was too high for the selected landing site. The pilot concluded that there were no suitable alternate landing sites and elected to land the aircraft from a left hand descending turn. The aircraft contacted the ground heavily and came to a stop within 35 feet of the touchdown area.

The hard landing resulted in damage to the right main landing gear, both wing tips, the propeller, the lower engine cowling and the aft fuselage. Examination of the aircraft's fuel system indicated that the loss of power was due to fuel exhaustion. The pilot had underestimated the aircraft's fuel consumption while banner towing and had not adequately monitored the fuel state.

19/11/85

FINDINGS:

Cause Related:

1. The fuel consumption for the banner towing operation was underestimated.
2. The aircraft fuel state was not adequately monitored.
3. The engine stopped from fuel exhaustion.

Other:

- Nil -

19/11/85

CAMROSE AVIATION LIMITED
CESSNA 172N C-GMLF
ROSALIND, ALBERTA 5 mi E
3 MARCH 1984

REPORT NUMBER: 84-W40015 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1615 MST
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 117 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

While in cruise, the engine lost power. A restart was successful, but the engine lost power again within 15 to 20 seconds, so the pilot carried out a forced landing on a narrow gravel road. During the landing roll, the left main wheel entered the soft shoulder of the road. The pilot applied brake and the aircraft skidded off the right side of the road into a snow-filled ditch, damaging the left wing and propeller.

Prior to take-off, the fuel tank quantities were checked using a dip-stick. As each tank was about one-quarter full, the pilot felt that there was adequate fuel for the planned flight. At the time of the power loss, the fuel was selected from both tanks. During the investigation, it was determined that the right tank was empty and that the left tank contained only enough fuel to run the engine for a few minutes.

.../2

02/04/86

When the engine lost power, the aircraft was in level flight with a slight nose-up, left-wing-low bank attitude. It is likely, therefore, that because of the aircraft's attitude, the small quantity of fuel remaining in the left tank could not be gravity fed to the engine. Because there was no fuel in the right tank, the engine lost power due to fuel exhaustion. There was insufficient fuel on board the aircraft for the planned flight.

## FINDINGS

### Cause Related:

1. There was insufficient fuel on board the aircraft for the planned flight.

2. The engine power loss was due to fuel exhaustion.

3. During the forced landing on the narrow road, directional control could not be maintained.

### Other:

-- Nil --

02/04/86

GENERAL SPRAY LTD.
PIPER PA18 CF-FFR
BLUFFY LAKE, ONTARIO ½ mi S
06 MARCH 1984

REPORT NUMBER: 84-C40013 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1135 CST
OPERATION: Specialty Aerial Application and Distribution
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,000 | 350 |
| LAST 90 DAYS | 90 | 60 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was flying at low level spreading jack pine seeds from his aircraft. After flying for about two and one-half hours and while at 75 feet, the pilot noticed that the aircraft engine began to run rough. He applied carburettor heat and carried out the required checks. The pilot could not maintain altitude, and an emergency landing was carried out on a snow-covered road. The aircraft rolled about 30 feet and then nosed over.

The temperature at the time was -25 degrees Celsius. The cause of the reduction in engine power was not determined; however, conditions were conducive to the formation of ice crystals in the fuel.

FINDINGS:

Cause Related:

1. For undetermined reasons, a reduction in engine power was experienced.

2. The aircraft nosed over during an emergency landing on a snow-covered road.

Other:

-- Nil --

21/11/85

LA RONGE AVIATION SERVICES LTD.
DE HAVILLAND DHC-6 C-FZZM
MOUNTAIN LAKE NORTHWEST TERRITORIES
22 MARCH 1984

REPORT NUMBER: 84-C44008 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1120 MST
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5,300 | 2,300 |
| LAST 90 DAYS | 250 | 250 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The charter flight was transporting barrels of fuel to a frozen lake. During the landing on skis, the nosewheel struck a one-foot snow-drift, and the aircraft skin wrinkled aft of the nose gear on the underside of the aircraft.

Many uneventful landings had been made at this airstrip. Because of the angle of the sun at the time of the occurrence, no visual clues of snow-drift conditions such as shadows were present, and the pilot was unaware of the presence of this hazard.

FINDINGS:

Cause Related:

1. The aircraft skin was damaged when the nose struck a snow-drift.

2. The pilot was not aware of the presence of the snow-drift before landing.

Other:

- Nil -

21/11/85

BONAVAIR LIMITED
MOONEY M20J C-GQIK
OTTAWA, ONTARIO
26 MARCH 1984

REPORT NUMBER: 84-040011 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1101 EST
OPERATION: Commercial Non-Revenue
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,100 | 20 |
| LAST 90 DAYS | 180 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was ferrying the aircraft from Peterborough to Ottawa. On the approach to Ottawa he lowered the gear, but the gear down light did not illuminate. The aircraft was flown past the control tower, and the tower controller indicated that the gear appeared down. Additional low passes were flown near the operator's hangar at the airport; again the gear was reported to be fully extended.

Although the mechanical gear indicator was in the gear down position, the pilot decided to operate the emergency gear extension system to ensure that the gear was down. The crank was engaged, and after about ten turns the pilot could feel no more resistance, and the crank turned freely. The pilot decided to land, and as the aircraft rolled along the runway after touchdown, all three landing gear collapsed.

Technical investigation determined that the gear had collapsed because of an internal overload of the landing gear actuator. The overload had occurred when the pilot used the emergency system to extend the gear. The gear was actually already in the down-and-locked position, but the gear down light had not illuminated properly. Examination of the gear position indicators found corroded electrical contacts on the down limit switch which controls the gear position light. This corrosion caused intermittent illumination of the light.

.../2

06/08/86

The problem with the intermittent gear down indication had been experienced previously by other company pilots who had passed on the information by word of mouth. The discrepancy had not been recorded in the aircraft journey log nor had it been rectified. The pilot who experienced the gear collapse had not been advised of the unserviceability.

The following laboratory reports were completed: LP 173/84 - Limit Switch and LP 145/84 - Landing Gear Actuator Fracture.

## FINDINGS:

### Cause Related:

1. Corrosion in the landing gear down limit switch caused intermittent illumination of the gear down position light, thus giving the pilot contradictory gear down indications.
2. The use of the emergency gear extension system on already extended gear fractured the landing gear actuator, causing all three gear to collapse on landing.
3. The landing gear down position light had been operating intermittently on preceding flights, but the discrepancy had neither been recorded in the aircraft journey log nor rectified.

### Other

- Nil -

## SAFETY ACTIONS:

### Actions Taken to Date:

A Safety Advisory has been sent to Transport Canada noting the vulnerability of the gear box housing to fracture as a result of continued operation of the handcrank and suggesting that this be made known to operators of this type of aircraft.

06/08/86

NEWFOUNDLAND AND LABRADOR AIR TRANSPORT
DEHAVILLAND DHC-2 MK1, C-FSDE
RED BAY, LABRADOR
13 APRIL 1984

REPORT NUMBER: 84-A40802
LOCAL TIME: 1900 AST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: COMMERCIAL

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4200 | 2500 |
| LAST 90 DAYS | 170 | 170 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

### SUMMARY REPORT:

The de Havilland Beaver landed and back tracked on the unlicensed 1500-foot airstrip to the parking area, immediately adjacent to the button of the runway. During the shutdown procedure, a Cessna 185 landed from the opposite direction and experienced failure of the left brake on the roll-out. With only right brake action, the landing aircraft veered right toward the parking area. Realizing that a collision was imminent, the pilot of the stationary aircraft shut off the mixture control just before the right wing of the Cessna struck the Beaver's rotating propeller. The Cessna swung sharply to the right bringing its propeller into contact with the right wing of the Beaver.

### FINDINGS:

#### Cause Related

1. The parking area available at the airstrip is immediately adjacent to the runway.

#### Other

- Nil -

DATE: 9 April 1985

I.M.P. AVIATION SERVICES LTD.
BRITTEN-NORMAN BN-2A-21 C-GMND
YARMOUTH, NOVA SCOTIA
14 APRIL 1984

REPORT NUMBER: 84-A44014 (Incident)
LOCAL TIME: 1230 AST
OPERATION: Charter
DAMAGE: None
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 4,600 | 700 |
| LAST 90 DAYS | 120 | 14 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

The day before the incident, the aircraft was parked outside during a heavy rainfall. The day of the incident, the aircraft carried out an over-water patrol. After 3.3 hours of flying, the aircraft landed at Digby Airport and all four fuel tanks were filled.

The aircraft departed for another over-water patrol. After flying about 20 minutes, the aircraft's engines began to run rough. The pilot carried out a precautionary landing safely at a nearby airport.

After landing, a substantial amount of water was found in the fuel from all four fuel tanks. This may have caused the engine to run rough. The investigation determined that there was no water contamination at the last point of refuelling. The source of the water found in the aircraft's fuel tanks was not determined. Although it could not be determined whether the fuel cap "O" rings were a factor in the occurrence, they were replaced.

FINDINGS:

Cause Related:

1. The fuel in all four fuel tanks was contaminated with water.

2. The last point of refuelling was not the source of contamination.

3. The source of the water could not be determined.

Other:

-- Nil --

DATE: 19/03/86

CESSNA 180H, CF-UQE
TAZIN LAKE, SASKATCHEWAN
16 APRIL 1984

REPORT NUMBER: 84-W40023 (Accident)
LOCAL TIME: 1630 MST
OPERATION: Private recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 7000 | 2000 |
| LAST 90 DAYS | 30 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

The pilot elected to land his wheel equipped aircraft on an ice-covered lake after receiving a favourable surface condition report from another pilot of a ski aircraft. During landing the aircraft encountered slush and water, nosed over and came to rest inverted.

The landing was made slightly offset from the tracks of the aircraft which provided the surface condition report.

FINDINGS:

Cause Related:

1. A landing was attempted on a surface felt to be suitable, based on a pilot report.

2. The landing surface contained an area of slush and water which caused the aircraft to nose over.

Other:

- Nil -

DATE: 9/05/85

BELVY AVIATION
HELIO H29 5 C-GPRQ
DANIELS HARBOUR, NEWFOUNDLAND

REPORT NUMBER: 84-A40005 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1500 AST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5000 | 200 |
| LAST 90 DAYS | 200 | 200 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft landed on the ice without difficulty. As the aircraft was taxiing downwind one of the wheel/skis broke through the ice. The pilot attempted to turn into the wind for a take-off, but during the turn, the ice gave way, and the aircraft settled in about four feet of water.

Prior to the flight, a local source had informed the pilot by telephone that the condition of the ice was suitable for landing. The pilot visually inspected the pond and then touched down on solid ice. However, in the pond there were several springs which had created soft spots in the ice. When the aircraft taxied over one of the soft spots, it broke through the ice.

FINDINGS:

Cause Related

1. The pilot had been informed by a local source that the ice was safe for landing.

2. The unsafe areas were not visually evident.

Other:

- Nil -

3/10/85

AVIBEC INC.
CESSNA 152 C-GVYD
BROMONT AIRPORT, QUEBEC
23 APRIL 1984

REPORT NUMBER: 84-Q40801 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1420 EDT
OPERATION: Specialty Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 90 | 90 |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

While the pilot was conducting a run-up, an aircraft taxied into the port wing tip of his aircraft.

FINDINGS:

Cause Related

1. While parked, the aircraft's port wing tip was struck by another aircraft.

Other

- Nil -

19/10/85

I.M.P. AVIATION SERVICES LTD.
BRITTEN-NORMAN BN-2A-21 C-GMND
SABLE ISLAND, NOVA SCOTIA
27 APRIL 1984

REPORT NUMBER: 84-A44015
LOCAL TIME: Unknown
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,000 | 2500 |
| LAST 90 DAYS | 200 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During take-off from a beach, the nose wheel struck a log buried in the sand. After a normal landing was completed at destination, post-flight inspection revealed the nose gear attachment point had suffered considerable damage.

The beach area used as an airstrip is normally kept clear of debris by ground personnel. However, constantly shifting sands bury objects, such as the log, which when undetected, become hazardous to flight operations.

FINDINGS:

Cause Related

1. The nose wheel struck a log buried in sand.

2. The buried log had not been detected when the airstrip was last checked.

Other

- Nil -

DATE: 09/05/85

GANDER AVIATION LIMITED
CESSNA 180J C-GLCQ
EXPLOITS ISLAND, NEWFOUNDLAND
29 APRIL 1984

REPORT NUMBER: 84-A40006 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1650 NST
OPERATION: Charter
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 17450 | 4600 |
| LAST 90 DAYS | 90 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

As the aircraft was taxiing to the proposed take-off area on the harbour ice, the left ski broke through a patch of decayed ice. The aircraft was left on the ice overnight and in the morning it was found partially submerged.

FINDINGS:

Cause Related

As the aircraft taxied out for take-off, the left ski broke through a patch of decayed ice.

Other

-- Nil --

19/9/85

CESSNA 180K, C-GUQW
LAC MORIALICE, QUEBEC
12 MAY 1984

REPORT NUMBER: 84-Q40021 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 2000 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 500 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The Cessna landed hard while making a glassy water landing. It bounced back into the air and stalled. The right wing tip and float hit the water and the aircraft nosed over.

The investigation revealed that the aircraft had just been taken out of winter storage and that the pilot had flown only once in the previous six months. Lacking recent experience with glassy water operations, the pilot stalled the aircraft after being surprised by the unexpected bounce. Inadequate stall recovery action allowed the wing tip and float to dig into the water and caused the aircraft to nose over.

FINDINGS:

Cause Related

1. This was the pilot's first experience with glassy water operations for the new season.

2. The aircraft stalled after an unexpected bounce on landing.

3. The stall recovery action was ineffective and caused the aircraft to strike the water and nose over.

Other

- Nil -

19/9/85

THE FLYING FIREMAN LTD.
CONSOLIDATED VULTEE PBY-5A C-GFFD
THUNDER BAY, ONTARIO
14 MAY 1984

REPORT NUMBER: 84-C40025 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1430 EDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,000 | 710 |
| LAST 90 DAYS | 50 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The crew departed for a training trip with the co-pilot conducting the take-off from the right seat. Pre-take-off checks including engine (Pratt & Whitney R1830-92) run-up were normal. Just after lift-off, the left engine lost power. At the same time, tower personnel saw a puff of white smoke coming from the left engine. The aircraft continued straight ahead for approximately one-half mile. Directional control could not be maintained, and the aircraft entered a turn at a very low altitude. With the airspeed decreasing, the captain took control. The left wing struck a hydro line; the aircraft then pitched down and crashed on a lawn in a residential area. Other than the crew, no one was injured in the accident.

The investigation determined that the left fuel tank, left engine-driven fuel pump, fuel filter, fuel lines and carburettor contained abnormally high amounts of water. The fuel in the right tank and fuel system was normal. It was determined that the water was not introduced by fuel suppliers.

The aircraft had not been flown for 14 days prior to the accident. Because of the slope of the ramp, the aircraft was parked with the left wing low. The fuel tanks were approximately half full and during the period the aircraft was parked, it had rained several times. Hence, conditions were conducive to the accumulation of water in the left tank due to the condensation of water vapour. The crew checked for water in the fuel tanks during the pre-flight checks.

.../2

21/11/85

Because of the angle of the wing and the relative specific gravity of water and fuel, the water was away from the drain area of the tank, and the large amount of water was not detected. When the wings were levelled during taxi and take-off, the water made its way into the fuel lines that feed the left engine. As a result, the left engine stopped.

The aircraft was rotated at 75 knots indicated airspeed (KIAS). The engine failed at 80 to 85 KIAS at an approximate altitude of 100 feet. By the time the crew had confirmed that the left engine had lost power and had feathered it, the airspeed had dropped below the single engine control speed (VMCA) of 78 KIAS. To get the airspeed above VMCA, it would have been necessary to trade altitude for airspeed. Because the aircraft was at a low altitude when the engine lost power, there was no extra altitude to trade and aircraft control could not be maintained.

Although not causal to this accident, an extension cord and fluorescent work lamp were found in the right wing during the investigation.

FINDINGS:

Cause Related:

1. The left engine lost power because there was water in the left fuel system.

2. The water was present because of the condensation in the left wing fuel tank.

3. The water was not detected because the aircraft was parked in a left-wing-down attitude.

4. After the left engine lost power, the speed decreased below the VMCA at low altitude.

Other:

1. Maintenance equipment was left in the aircraft's right wing.

21/11/85

THE FLYING FIREMAN LTD.
CANSO PBY-5A C-FFFW
SILVER LAKE, ONTARIO
15 MAY 1984

REPORT NUMBER: 84-C44021 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1600 CDT
OPERATION: Specialty Aerial Control
DAMAGE: Minor
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,600 | 2,200 |
| LAST 90 DAYS | 45 | 43 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was engaged in water bombing operations. During a water pick-up, the left engine (Pratt and Whitney R1830-92) lost power, and the pilot rejected the take-off. While taxiing back toward the take-off position, an abnormally low cylinder head temperature was noticed on the left engine. The aircraft was turned into wind to conduct a functional test of the left engine. With take-off power applied, the crew tried and failed to get the aircraft on to the "step". Power was reduced and as the aircraft settled, the crew noticed that the aircraft was in a pronounced tail-low attitude and that water was entering through the lower hull gunnery hatch. Unable to stop the water flow, the crew shut down the engines and exited through the overhead hatch. The aircraft sank to wing level.

The investigation revealed that the reduced performance of the left engine was due to a valve failure in the number one cylinder.

The lower hull gunnery hatch was found open. The aligning pin was found extended but the aligning hole and the lower hatch structure had failed in overload. Primary locking of the hatch is performed with a six-point lever-action slide mechanism. The hatch had been secured using only the aligning pin which does not provide adequate strength to prevent the hatch from opening while the aircraft is operating on the water surface. The hatch secured with only the aligning pin would appear closed during the external pre-flight inspection; however, an internal inspection of the primary locking mechanism would reveal that the hatch was not properly secured.

.../2

This was the first day of water operations for this aircraft since the flight from its home base in Victoria, British Columbia. It is not known when the hatch had been last used and then secured improperly.

FINDINGS:

Cause Related:

1. Reduced performance was caused by a valve failure in the number one cylinder.
2. The hatch had been secured with the aligning pin only and not the primary locking mechanism.
3. The hatch aligning hole and adjacent structure failed in overload.
4. The pre-flight inspection did not reveal that the locking mechanism was not engaged.

Other:

- Nil -

02/04/86

FOREST PROTECTION LIMITED
GRUMMAN TBM3, C-GLEH
BROCKWAY, NEW BRUNSWICK
18 MAY 1984

REPORT NUMBER: 84-A40007 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1543 ADT
OPERATION: Specialty Aerial Application
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 11500 | 400 |
| LAST 90 DAYS | 5 | 0.1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

In preparation for landing, the gear was extended and 15 degrees of flap was selected. On landing rollout, the main gear retracted.

In an extension test following the accident, the gear operated normally. No mechanical malfunction could be found to explain why the landing gear retracted.

FINDINGS:

Cause Related

1. Undetermined.

Other

-- Nil --

19/9/85

C&M AIRWAYS
DEHAVILLAND DHC-2, C-GEZT
CLEARWATER RIVER, SASKATCHEWAN
21 MAY 1984

REPORT NUMBER: 84-C40026
LOCAL TIME: 1750 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20000 | 2500 |
| LAST 90 DAYS | 135 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The wind was gusty and variable as the Beaver approached to land against the river current. During the final stages of the approach, a right-wing-low attitude was maintained in order to keep the aircraft aligned with the landing path. Just when the aft section of one float touched the water, a gust of wind lifted the left wing, veering the aircraft toward the shoreline. The pilot initiated recovery action and regained directional control, but the aircraft was then flying at low airspeed toward rapids with rising terrain beyond. As insufficient room remained for a normal roll-out or a go-around, the aircraft was landed and run up onto the shore. The floats sustained substantial damage.

FINDINGS:

Cause Related

1) Gusty and variable wind conditions created unforeseen control problems on touchdown.

2) Necessary recovery action placed the aircraft beyond the intended touchdown point.

3) Terrain and surface obstructions then precluded normal go-around or landing manoeuvres.

Other

DATE: 9 April 1985

-- Nil --

NORFOLK AERIAL SPRAYING LTD.
PZL MIELEC M18 C-GMVS
FREDERICTON, NEW BRUNSWICK
26 MAY 1984

REPORT NUMBER: 84-A44033 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1744 ADT
OPERATION: Specialty Aerial Control
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3100 | 300 |
| LAST 90 DAYS | 18 | 14 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was taking-off from a private airstrip on a fire supression mission. At lift-off the left main gear wheel fell off. The pilot continued the take-off, dropped the load of fire retardant and diverted to another airport where more emergency services were available. On landing, the aircraft ground looped, however, damage was limited to the left brake assembly.

Examination of the safety bolts, used to prevent the wheel retaining nut from backing off, showed they were shorter than specified by the aircraft parts catalogue. As the retaining nut loosened, the wheel assembly slid off the axle and fell from the aircraft.

FINDINGS:

Cause Related

1. The safety bolts were too short to secure the wheel retaining nut.
2. The wheel retaining nut backed off allowing the wheel assembly to fall from the aircraft.

Other

- Nil -

19/9/85

LOON-AIR BAIT LTD.
PIPER PA-18 C-FNGC
EAR FALLS, ONTARIO 80 mi NE
31 MAY 1984

REPORT NUMBER: 84-C40028
LOCAL TIME: 1400 CDT
OPERATION: Specialty Commercial Air Service
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 400 | 100 |
| LAST 90 DAYS | 86 | 86 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After lift-off from a lake, the pilot felt that the aircraft was not climbing fast enough to clear trees ahead. The climb was discontinued, full flap was selected and a landing attempted. The aircraft touched down heavily in a nose-down, right wing down attitude and was substantially damaged.

It was reported that gusty winds were encountered at the flare point resulting in the hard landing. Pilot fatigue was cited as influencing the ability to assess the take-off performance at an earlier stage. The pilot had been on duty 8 hours and had flown 6 hours on the day of the occurrence. The pilot had flown long hours in the previous days doing the same type of flying. The take-off distance available was not fully utilized.

FINDINGS:

Cause Related:

1. The available water take-off distance was not entirely utilized.

2. When it was felt that the aircraft would not clear trees ahead, the initial climb was discontinued and the aircraft was landed heavily on the water.

3. Pilot fatigue interfered with timely assessment of take-off performance.

Other:

- Nil -

DATE: 09/05/85

MAPLE AIR SERVICES LIMITED
PIPER PA44-180 C-GBNU
LESTER B. PEARSON INTERNATIONAL AIRPORT
TORONTO, ONTARIO
31 MAY 1984

REPORT NUMBER: 84-040024 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1515 EDT
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6,000 | 150 |
| LAST 90 DAYS | 120 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot and check-pilot were on a local flight to practise approaches. During an instrument landing system (ILS) approach to land on runway 24 right, the pilot selected the landing gear down. Both pilots received positive indication that all three landing gear were down and locked. As the aircraft touched down, the nose gear retracted upon contact with the surface, and the aircraft slid along the runway. The propeller and nose structure sustained substantial damage.

The investigation revealed that a bolt in the nose gear drag link assembly had failed on touchdown, thus allowing the nose gear to retract. An analysis of the bolt determined that the failure was due to fatigue caused by repeated applied loads on landing. The bolt's design strength was inadequate for the frequency and magnitude of the loads being applied in normal service.

The manufacturer had been aware of similar failures and had improved the shear and tensile strength of the drag link bolt in later production aircraft. Owners of earlier models of the aircraft had not been notified of the potential fatigue problem. Transport Canada has advised all PA44 operators to replace the bolt if damage is evident on inspection.

The following laboratory report was completed: LP 152/84 - Main Landing Gear Failure.

06/08/86

FINDINGS:

Cause Related:

1. The nose gear retracted on touchdown.
2. A bolt in the nose gear drag link assembly had failed due to fatigue.
3. The bolt's design strength was inadequate for the loads experienced in normal service.
4. Owners of earlier models of the aircraft had not been notified of the potential fatigue problem.

Other:

- Nil -

SAFETY ACTION:

Action Taken:

1. The Piper Aircraft Corporation has stated that it will issue a service publication recommending replacement of the nose gear drag link bolt with one designed to have a longer service life.

06/08/86

FOREST PROTECTION LTD
GRUMMAN TBM-3, C-GLEP
ST. CROIX 8 MI SSW, NEW BRUNSWICK
10 JUNE 1984

REPORT NUMBER: 84-A40013 (Accident)
LOCAL TIME: 0530 ADT
OPERATION: Special Application
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3700 | 400 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The lead aircraft, flown on a forest spraying program, had completed two lines at low level with a similarly equipped aircraft following. Rolling out of a turn to commence a third run the pilot saw a dead tree sticking up above the rest of the vegetation. The left wing tip and aileron struck the deadhead. The pilot was unable to regain control and the aircraft descended through the trees. On impact with the ground the aircraft broke into three large sections.

When the wing struck the deadhead the pilot was unable to level the wings causing a continuation of the turn into additional trees. As pilot of the lead aircraft he is required to orient himself with respect to the next line to be sprayed. This duty may have influenced his altitude control and distracted his attention from obstacles in his flight path.

.../2

DATE: 09/05/85

FINDINGS:

Cause Related:

1. Suitable altitude was not maintained during the turn.

2. The obstruction was not seen in time to be avoided.

3. Control of the aircraft was lost after hitting the tree.

Other:

-- Nil --

DATE: 09/05/85

CAPE BRETON AVIATION SERVICES LTD.
CESSNA 172 C-FUWF
SYDNEY AIRPORT, NOVA SCOTIA
14 JUNE 1984

REPORT NUMBER: 84-A40014 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1530 ADT
OPERATION: Specialty Recreational Flying
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 125 | 23 |
| LAST 90 DAYS | 6 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

As the aircraft touched down in a light cross-wind from the left, it began to vibrate violently. It then went out of control and swerved to the left. The pilot applied right rudder and brake to stop the swerve but was unsuccessful. The aircraft continued off the left side of the runway, and its left wing struck a runway designation sign before coming to rest about 150 feet beyond the sign.

The investigation did not reveal any mechanical defect which would have contributed to the accident. The handling techniques used were appropriate for the wind conditions, except the approach speed of between 75 and 80 mph was higher than normal. The violent vibration was attributed to nosewheel shimmy. The aircraft then experienced a wheelbarrow effect which produced an uncontrollable turn. The cross-wind acting on the fin and rudder turned the aircraft to the left off the runway.

FINDINGS:

Cause Related:

1. The aircraft touched down at a higher than normal airspeed in cross-wind conditions.

2. The higher touchdown speed contributed to a wheelbarrow effect causing an uncontrollable turn to the left.

3. Control could not be regained and the aircraft hit a runway designation sign.

26/06/86

SABER AVIATION INCORPORATED
BEECH G18S N1480K
LONDON AIRPORT, ONTARIO
15 JUNE 1984

REPORT NUMBER: 84-040902 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0250 EDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 16,000 | 200 |
| LAST 90 DAYS | 210 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After take-off at night from Stratford Airport on the return leg of a cargo delivery flight from the United States, the left engine (Pratt & Whitney R985-14B) of the aircraft seized. The pilot could not feather the left engine propeller and continued to London Airport. The aircraft battery failed, and as the right generator was unserviceable prior to take-off, all electrical power was lost. Without electrical power, the pilot was unable to contact the London flight services station by radio to declare an emergency or ask for the runway lights. He elected to carry out a gear-up landing on runway 33. The aircraft received substantial damage to the lower engine cowling, the propellers, and the belly antennae as a result.

The investigation concluded that the engine seized as a result of oil exhaustion that was caused by a leak in an external oil line. The oil line and the rocker box cover showed evidence of being repaired with an unapproved plastic material. The reason for the unserviceable right generator was not established. The pilot decided not to manually lower the gear as he believed that there was not enough power available to overcome any additional drag.

.../2

16/10/85

FINDINGS:

Cause Related:

1. The engine seized because of oil exhaustion which was the result of a leak in the external oil return line. The line had been repaired with an unapproved plastic material.

2. The pilot could not lower the gear normally due to the lack of electrical power.

3. The pilot chose not to use the emergency gear extention system and landed with the gear up.

Other:

1. The right generator was not functioning when the flight began.

16/10/85

AIR BROUSSE INC.
CESSNA 310R C-GAPA
LAC MATANE, QUEBEC
20 JUNE 1984

REPORT NUMBER: 84-Q40036 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1945 EDT
OPERATION: Specialty Aerial Control
DAMAGE: Destroyed
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,300 | 100 |
| LAST 90 DAYS | 125 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The object of the flight was to conduct a low-level reconnaissance of the surface winds prior to a spraying operation. The pilot had not planned the route prior to the flight, as his passenger/observer was going to advise, in flight, which areas would be covered.

After 35 minutes of flight, the observer asked the pilot to turn into a valley. The pilot readily executed the manoeuvre, but quickly realized that the aircraft would not be able to clear the mountain closing the valley. Since the surrounding terrain did not permit a 180-degree turn, the pilot applied full power to climb over the terrain ahead. It became evident that the aircraft would not clear the mountain, and at 350 feet from the crest, the pilot stalled the aircraft into the trees on the side of the mountain.

The pilot did not plan the flight because he intended to follow the verbal requests of the observer; he was therefore unaware of the type of terrain he would encounter during the flight. Even with full power, the climb capability of the aircraft was exceeded by the gradient of the mountain.

.../2

06/08/86

FINDINGS:

Cause Related:

1. The pilot did not adequately plan the low-level flight.
2. The pilot, following the observer's request, flew into a blind valley.
3. When the pilot realized that he could not clear the mountain, he intentionally stalled the aircraft into the trees.

Other:

- Nil -

06/08/86

PARSONS AIRWAYS NORTHERN LTD
DE HAVILLAND DHC-2 C-GYOK
LAC BROCHET, MANITOBA
30 JUNE 1984

REPORT NUMBER: 84-C40042 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 CDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,400 | 150 |
| LAST 90 DAYS | 150 | 140 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | 1 | 1 | 4 |

SUMMARY REPORT:

The float-equipped aircraft departed from a fishing camp with six passengers on board. The intent was to fly to a lake 45 miles away. At the time of departure, the wind was gusting to about 25 knots and producing three-to-four-foot waves on the lake. During the take-off, the aircraft became airborne and then struck the water in a right-wing-low and slightly nose-down attitude. The floats remained intact and the aircraft remained afloat, but during the impact, two passengers were ejected from the aircraft; one of the passengers drowned.

There were indications that the pilot had reservations about operating in the rough conditions present on the lake and had decided not to return after this departure until the wind conditions improved. During the take-off run, the aircraft became airborne prematurely when it bounced off a wave. The aircraft stalled and struck the water.

It was determined that the two passengers who were thrown from the aircraft were not wearing seat-belts and, in fact, no aircraft seat was available for them. Two seats had been removed from the aircraft because of requirements on a previous charter. The two passengers were sitting on baggage which had been placed on the floor between the rear doors of the aircraft. During the impact, the two unrestrained passengers were thrown against the right rear door which then popped open. The door popped open likely because of the combination of forces developed by the thrown passengers and impact forces generated when the aircraft hit the water. Because of the prevailing wind, the aircraft drifted away from the two passengers in the water. The pilot attempted to restart the engine in order to get the aircraft back to the passengers, but the engine would not start. One of the passengers was picked up by boat, but the other passenger drowned before he could be reached.

.../2

28/05/86

It was reported that the pilot was under considerable pressure from the fishing camp management to move as many passengers as possible. The pilot reluctantly agreed to take the two extra passengers and then directed them to sit on duffle bags. Operating an aircraft while taking off with passengers unrestrained is contrary to regulation and safe operating practices.

## FINDINGS:

### Cause Related:

1. A take-off was attempted during unfavourable wind and water conditions.

2. The aircraft was operated while two passengers were without seats or seat-belts.

3. The unrestrained passengers were thrown from the aircraft as a result of impact forces.

### Other:

- Nil -

28/05/86

CESSNA 210N N9604Y
KELSALL LAKE, BRITISH COLUMBIA 9 MI S
26 AUGUST 1983

REPORT NUMBER: 83-W30903 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1920 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2000 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The aircraft was operating under Visual Flight Rules from Fairbanks Alaska to Whitehorse, Yukon, along the Alaska highway. Three hours after the aircraft took off, a man driving north on the Haines Road observed the aircraft spinning to the ground and noted that one wing was detached from the fuselage. He notified the RCMP of the wreckage location, which was approximately 78 miles south of the Alaska Highway-Haines Road junction, well west of either the direct or Highway route.

Investigation revealed that the right wing had failed in flight. Laboratory analysis of the recovered wing section disclosed no evidence of pre-occurrence fatigue cracking; all failures appeared to be due to overstress of the structures. The remains of the aileron and hinge brackets displayed signs of overtravel in both directions, indicative of flutter.

No indication of other mechanical discrepancies was found. Medical examination revealed no evidence of pilot incapacitation. A weather analysis showed that, at around the time of occurrence, a trough of warm air aloft (TROWAL) passed through the area trailing a narrow band of cumulonimbus cloud with associated turbulence and heavy shower activity. It is believed that the turbulence associated with this system was a factor in the accident but, as the altitude flown and actual flight path are unknown, the sequence of events leading to the overload failure of the wing could not be determined.

The ELT was rendered inoperable by impact forces.

The following laboratory report was completed: LP 378/83.

19/09/85

.../2

FINDINGS:

Cause Related:

1. The right wing failed in flight due to overload.
2. Damage to the right aileron was indicative of aileron flutter.
3. The exact sequence of events leading to the wing failure could not be determined.

Other:

1. The ELT was rendered inoperable by impact damage.

19/09/85

PA 18-150, C-GVCQ
TWITYA RIVER, NWT
02 SEPTEMBER 1983

REPORT NUMBER: 83-W30048 (Accident)
LOCAL TIME: 1100 MST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 200 | 150 |
| LAST 90 DAYS | 130 | 100 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | - |

SUMMARY REPORT:

The pilot and passenger were conducting a low level aerial search for a lost horse. During a turn the aircraft contacted trees and crashed in dense forest.

The search was being conducted at 200 feet above ground level at an approximate indicated airspeed of 45 knots when the passenger spotted something among the trees. The pilot banked the aircraft to get a better look at what was seen. The airplane stalled in the turn and could not be recovered before hitting the trees.

FINDINGS:

1. Attention was diverted from operation of the aircraft.

2. The aircraft stalled in a turn.

3. Because of the low operating altitude, stall recovery could not be made before hitting trees.

Other:

- Nil -

DATE: 09/05/85

MOONEY M20A C-FNLZ
SUDBURY AIRPORT, ONTARIO 2 mi E
23 SEPTEMBER 1983

REPORT NUMBER: 83-030086 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2008 EDT
OPERATION: Private Training
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,600 | 6 |
| LAST 90 DAYS | Unknown | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was on his first night flight in this particular aircraft. On the final approach of a second circuit, the lights of the aircraft disappeared from the tower controller's view. Thirty minutes later, a search located the wreckage 3 miles from the end of the runway along the final approach path. The aircraft had crashed into the bank of a steep tree-covered ravine.

Witnesses reported that they had heard the aircraft's engine sputter and stop. It was also reported that the pilot complained that he had difficulty in changing the fuel tank selector valve because he found the cockpit location of the valve awkward.

The investigation revealed that two of the three aircraft fuel tanks were empty and that the power loss was due to fuel starvation. An examination of the cockpit showed that although the fuel quantity indicator was set to display the tank containing fuel, the fuel tank selector valve was positioned to an empty tank.

The engine stopped at an altitude that was too low to allow the pilot the time to switch fuel tanks and attempt a restart. As a result, the aircraft descended into the trees and crashed.

.../2

16/10/85

FINDINGS:

Cause Related:

1. The engine stopped as a result of fuel starvation.
2. The fuel quantity indicator was set to display the tank containing fuel while the fuel tank selector valve was positioned to an empty tank.
3. The pilot had indicated that he found the operation of the fuel tank selector valve awkward because of its location in the cockpit.

Other:

1. This was the pilot's first night flight in this aircraft.

CESSNA 172, C-GXEK
EAGLE PLAINS, YUKON TERRITORY
29 SEPTEMBER 1983

REPORT NUMBER: 83-W30052 (Accident)
LOCAL TIME: 1530 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 50 | 4 |
| LAST 90 DAYS | 48 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The newly purchased aircraft was being ferried from Dawson City, Yukon to Inuvik, N.W.T. The preflight weather briefing warned of deteriorating conditions enroute. The VFR flight progressed normally for two hours then, as the pilot followed a highway into a snow covered mountain pass, low cloud was encountered. During an attempt to turn back all visual reference was lost because of whiteout conditions. In order to avoid high ground and regain the highway, a complete 360° turn was made. The aircraft then entered cloud and as it emerged, the main wheels struck the highway. The aircraft became airborne, and a few seconds later, struck the highway again. The nose wheel detached and the aircraft ran into gently rising ground, nosed over and came to rest inverted. The occupants escaped without injury.

Low cloud and snow covered mountainous terrain created whiteout conditions. The newly qualified pilot unfamiliar with mountain flying techniques, having previously lost visual reference, attempted to keep the road in sight. This resulted in the flight continuing into rising terrain and deteriorating weather conditions.

.../2

DATE: 09/05/85

FINDINGS:

Cause Related:

1. Visual flight was continued into conditions of low cloud and fog.
2. The pilot attempted a flight beyond the capabilities of his experience or training.

Other:

-- Nil --

ROCKWELL COMMANDER 112 N1077J
SPANISH, ONTARIO 4nm W
2 OCTOBER 1983

REPORT NUMBER: 83-034910 (Incident)
LOCAL TIME: 1823 EDT
OPERATION: Private Recreation
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 127 | 86 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

As bad weather had been encountered for some time on a VFR Flight, and fuel on board was nearly exhausted, a precautionary landing was made onto a highway.

The reduced flight visibility in rain and low cloud had made navigation difficult. Lost in an area of forest and lakes, the pilot used the highway as the only suitable landing area available.

FINDINGS:

Cause Related:

1. Flight was continued into adverse weather conditions.

2. The pilot became lost in bad weather.

3. A precautionary landing was made to avoid fuel exhaustion.

Other:

- Nil -

19/09/85

CESSNA 185B C-FPKJ
LANGDON, ALBERTA
18 OCTOBER 1983

REPORT NUMBER: 83-W30060 (Accident)
LOCAL TIME: 0945 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,400 | 1,000 |
| LAST 90 DAYS | 46 | 28 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Just after take-off from a sod field, the aircraft pitched nose down and rolled to the right. The right wing tip hit the ground, the aircraft rolled left, and the main wheels hit. The left main landing gear collapsed, and the aircraft nosed over.

The investigation did not reveal any pre-accident aircraft malfunction or failure. The condition of the propeller indicated that the engine was delivering power at the time of the impact, and, following the accident, an engine run-up confirmed that the engine was capable of producing full power. Weather conditions during the night were conducive to the formation of frost, and, as the aircraft had been parked uncovered outside, frost had formed on the aircraft surfaces. The temperature at take-off time was about minus two degrees Celsius.

Prior to the flight, the pilot noted water dripping off the aircraft. The sun was shining at a very low angle from the rear of the aircraft and was melting the frost. The pilot reported that there was water and slush on top of the wings, but he did not clean them off. It is probable there was still frost on the most critical area, the upper, forward surface of the wing, which was out of the direct sunlight.

The presence of any foreign substance on an aircraft wing, especially on the upper, forward surface, increases the stalling speed of the aircraft. In this occurrence, the evidence indicates that the presence of water, slush, and probably frost on the wings caused the aircraft to stall when the pilot rotated it to the climb attitude after lift-off. The stall occurred at too low a height for the pilot to effect recovery.

02/05/86

The aircraft struck the ground hard in a nose-down attitude, and the left main landing gear attachment bolt failed in tension and shear. There was no indication of pre-impact failure of the bolt.

Prior to the flight, the pilot had left the aircraft unattended with the engine running, for a period of 20 to 40 minutes, while he was preparing to leave his house. Part VIII - Miscellaneous Provisions, paragraph 803, of Air Regulations states that:

> The engine or engines of any aircraft shall not be
>
> (a) started unless the pilot's seat is occupied by a person competent to control the aircraft or unless the aircraft is prevented from moving forward; or
>
> (b) left running unless the pilot's seat is occupied by a person competent to control the aircraft.

FINDINGS:

Cause Related:

(1) The aircraft stalled because of water, slush, and probably frost on the wing surfaces.

(2) The landing gear collapsed because the aircraft landed hard in a nose-down attitude.

Other:

(1) The pilot left the aircraft unattended with the engine running.

02/05/86

CESSNA 177B, C-GYZR
DELTA AIRPARK, BRITISH COLUMBIA
16 DECEMBER 1983

REPORT NUMBER: 83-P30081
LOCAL TIME: 1630 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 20 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft departed from Penticton for a visual flight to Boundary Bay. Approximately 3 miles east of Delta Airpark the engine stopped. The engine was restarted and the flight continued toward Boundary Bay. At 1½ miles west of Delta Airpark the engine stopped again and could not be restarted. The aircraft was unable to reach Boundary Bay and an attempt was made to return to Delta Airpark. On approach, it was realized that the aircraft might not reach the runway and it was decided to land on a cultivated field short of the aerodrome to avoid a large drainage ditch in front of the runway. During touchdown the nose wheel was torn off when it struck mud, the aircraft nosed- over and came to rest inverted.

The engine had a history of rough running. On the previous trip, the same day as the accident, the engine ran roughly shortly after take-off, but this was considered to be quite routine for this aircraft. It was reported that water was often found in the fuel tanks and a substantial amount of water had been drained from the fuel that day. Laboratory analysis of fuel tank samples showed water still present, as well as other solid contaminants. The engine ran normally on a test stand following the accident, indicating that the engine failed because of fuel contamination.

.../2

DATE: 09/05/85

CESSNA P210N C-GVVY
FORT VERMILION, ALBERTA 50 mi E
21 DECEMBER 1983

REPORT NUMBER: 83-W30066 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1640 MST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,868 | 51 |
| LAST 90 DAYS | 90 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

Shortly after the aircraft levelled off at 12,000 ft, the pilot noticed that the oil pressure was decreasing. The propeller surged a few times, followed by a loud bang from the engine (Continental T510-520P). Oil began to spray on to the windshield, lightly at first, then very heavily. The engine continued to operate for a brief period before it stopped completely. The pilot carried out a wheels-up forced landing in a snow-covered creek bed.

The laboratory analysis found that the engine stopped because the number 2 main bearing shell had shifted. The clamping force loosened which allowed the shell to move aft until its edges contacted the crankshaft cheek radius. This shifting caused a blockage of the oil lubrication passages, which resulted in the generation of excessive heat and oil starvation of the main bearing and the connecting rods. It was found that the cylinder base studs and through bolts were not tightened to the correct torque value. When several connecting rods failed, they punctured the crank case top, causing oil to spray on to the windshield.

Continental Motors recommends that the torque values of the cylinder base studs and through bolts be checked after 100 hours of operation on new or overhauled engines. This aircraft had two previous owners before being purchased by the company and there were 1,195 hours on the engine when the stoppage took place. There was no evidence that the recommended check of the torque values had been completed since this engine was put into service.

.../2

18/03/86

The air crew reported to maintenance personnel that oil consumption during the previous 10 hours of operation was in excess of 1½ to 2 litres per hour. Planned corrective action was deferred until a later date.

The following laboratory report was completed: LP 146/84 - Engine Examination.

## FINDINGS:

### Cause Related:

1. The clamping force on the bearing shell loosened which allowed the main bearing to shift and resulted in the blockage of the oil lubrication passages, excessive heating and a loss of engine power.
2. No evidence could be found that the engine manufacturer's recommended check of the torque values of the cylinder base studs and through bolts had been completed on this engine.
3. During the previous 10 hours of operation, the high rate of oil consumption was reported but corrective action was deferred.

### Other:

-- Nil --

18/03/86

CESSNA 172, C-GVOW
ROSE VALLEY 8 MI WNW, SASKATCHEWAN
22 JANUARY 1984

REPORT NUMBER: 84-C40004 (Accident)
LOCAL TIME: 1640 MST
OPERATION: Private recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 335 | 20 |
| LAST 90 DAYS | 9 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

## SUMMARY REPORT:

While cruising on a cross-country trip, the engine developed a vibration and a loss of power. The pilot reported he was unable to maintain altitude and made a forced landing on a grid road. After landing, the aircraft slid to one side of the road because of icy conditions and a 10-knot cross-wind. The aircraft encountered some snow-drifts, then slowly nosed over and came to rest inverted.

The engine was found to have a broken rocker-arm stud bolt which caused the power loss. Laboratory analysis determined that the bolt failed in one-way bending fatigue of a high-cycle, low-stress nature. No material defect or deficiency was found in the bolt.

The following laboratory report was completed: LP 131/84 - Rocker Arm Stud.

## FINDINGS:

### Cause Related:

1. The engine lost power due to a fractured rocker-arm stud bolt.

2. The bolt failed in one-way bending fatigue of a high-cycle, low-stress nature.

3. The aircraft slid to the side of the road selected for the forced landing because of icy surface conditions and cross-winds.

### Other:

DATE: 09/05/85

-- Nil --

UNITED TECHNOLOGIES
SABRE 60-A N5075L
ST. HUBERT, QUEBEC
6 FEBRUARY 1984

REPORT NUMBER: 84-Q40901 (Accident)
LOCAL TIME: 0749 EST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8000 | 2000 |
| LAST 90 DAYS | 600 | 200 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

As the aircraft touched down, following an IFR approach, the main starboard gear and inner flap hit a two-foot high snow ridge on the runway centerline. The starboard main gear door was torn away as the aircraft veered abruptly right. Directional control was regained on a cleared portion of the runway and the landing roll was completed without further incident.

The investigation determined that snow removal equipment had only partially cleared the runway by the time the approach was started. The control tower had not been advised that the plows had left a bank of snow running part way down the runway centerline. It was not possible in the reduced visibility for either the controller or the flight crew to see the obstruction prior to touchdown.

FINDINGS:

Cause Related:

1. The runway was only partially cleared prior to touchdown.
2. Snow removal personnel did not advise the tower of the obstruction created by their operation.
3. The reduced visibility prevented the flight crew from seeing the ridge of snow on the runway centerline.
4. The aircraft hit a snow ridge on touchdown.

Other:

- Nil - 19/09/85

CESSNA A185F C-FCXO
NANTON, ALBERTA, 15 MI W
19 FEBRUARY 1984

REPORT NUMBER: 84-W40009
LOCAL TIME: 1700 MST
OPERATION: Private Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3000 | 1500 |
| LAST 90 DAYS | 60 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During final approach and touchdown at the private dirt strip, a left-wing-low attitude was maintained to compensate for a 30 deg, 15 kt cross-wind. Before the aircraft settled, the left main wheel hit a pot-hole and the gear leg tore free, causing the propeller and left wing to strike the ground.
FINDINGS:

Cause Related:

1. The cross-wind necessitated a left-wing-low landing.

2. The surface of the strip was rough.

Other:

- Nil -

DATE: 09/05/85

CESSNA 177RG C-GFNZ
BLACK STURGEON LAKE, ONTARIO
24 FEBRUARY 1984

REPORT NUMBER: 84-C44006 (Incident)
LOCAL TIME: 1710 CST
OPERATION: Private Company Business
DAMAGE: None
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | Not Available | Not Available |
| LAST 90 DAYS | Not Available | Not Available |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

During normal cruise, the pilot noticed that the engine oil pressure was dropping and shortly thereafter, the engine rpm suddenly increased. Only by reducing throttle could the rpm be brought back to more normal speeds. A forced landing was carried out successfully on a frozen lake with no further damage.

An inspection of the engine revealed that the stainless steel line which transfers pressurized engine oil to the propeller governor had failed at a point one and one-half inches from the propeller governor attachment fitting. Engine oil was lost, which led to the loss of oil pressure and caused the propeller to go to fine pitch.

The cause of the oil line failure could not be determined because the fracture surfaces were damaged during attempts to repair the line at the site of the forced landing. The engine had only flown six hours since a major overhaul; installation of the oil line to the propeller governor was part of that overhaul. Prior to installation, the line had been visually inspected and was deemed to be acceptable for re-installation.

FINDINGS:

Cause Related:

1. The oil pressure line to the propeller governor failed resulting in an engine over-speed.

2. The condition of the line was not detected during the engine overhaul.

Other:

- Nil -

18/03/86

CESSNA 340A, C-GTIG
MEDICINE HAT, ALBERTA
24 FEBRUARY 1984

REPORT NUMBER: 84-W40010 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1450 MST
OPERATION: Private Company Business
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 9,000 | 4,000 |
| LAST 90 DAYS | 140 | 120 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

Following a flight to Vancouver, the pilot had all fuel tanks filled for a flight to Medicine Hat. An instrument flight rules flight plan was filed, and the aircraft was assigned to a cruising altitude of 21,000 feet. To compensate for a fuel imbalance which occurred en-route, use of the right auxiliary tank was extended. When the pilot received approach clearance, he descended and flew over the airport prior to joining a left hand circuit for runway 21. The right main tank was selected "on" when the aircraft flew over the airport. As the pilot turned left base, he advanced the throttles but there was no response. He attempted to restart the engines by selecting fuel booster pumps and by switching tanks, but was unsuccessful. The aircraft glanced off the roof of an apartment building, then struck power wires and a garage. Fire broke out which destroyed the cabin interior and the left wing and engine. The five occupants were able to exit the aircraft via the rear cabin door. The emergency locator transmitter (ELT) did not function because of circuit component failures.

Examination of the aircraft wreckage not destroyed by fire failed to reveal any pre-impact mechanical discrepancies. The positions of the fuel selection handles mounted on the cockpit floor and the fuel selectors mounted in the engine nacelles could not be accurately determined because of the fire and impact damage to the inter-connecting linkage. Examination of engines indicated that neither engine was under power when the aircraft struck the ground.

The following laboratory report was completed: LP 82/84 - ELT Failure Analysis.

... /2

FINDINGS:

Cause Related:

1. The aircraft experienced a loss of engine power of undetermined origin.

Other:

1. The ELT did not activate at impact.

18/03/86

PIPER PA-24, C-FUUF
CRANBROOK, BRITISH COLUMBIA 13 MI SE
27 FEBRUARY 1984

REPORT NUMBER: 84-P40005
LOCAL TIME: 1520 PST
OPERATION: Private Recreation
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 336 | 15 |
| LAST 90 DAYS | 6 | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft was cruising in level flight at 9,000 feet when the engine stopped. Attempts to restart the engine were unsuccessful and a forced landing was carried out on rolling pasture land. The aircraft was damaged after landing, when it struck a barbed wire fence and an irrigation pipe.

When the engine failed, only corrective action for carburettor icing was carried out. Fuel source, mixture and switches were not checked.

Investigation revealed that the left fuel tank had been selected to supply fuel to the engine, but was empty. The right tank contained sufficient fuel for the intended flight. The left tank had been selected as an air test item on the previous flight which followed an inspection. The intention was to switch the tank selector to the right tank prior to take-off, but this was not done. The engine stopped because of fuel starvation.

DATE: 9 April 1985

FINDINGS:

Cause Related

1. Engine power was lost because of fuel starvation.
2. A check of fuel source, mixture and switches was not carried out.
3. It was assumed that the right fuel tank, which contained adequate fuel for the intended flight, was supplying the engine. The belief that carburettor icing caused the engine to stop may have limited the pilot's attempts to look for other causes.

Other

- Nil -

PIPER PA-28R CF-WGT
BRITT, ONTARIO 4.5 mi SE
7 MARCH 1984

REPORT NUMBER: 84-040008 (Accident)
LOCAL TIME: 1015 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 855 | 518 |
| LAST 90 DAYS | 34 | 34 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

About 1 hour and 20 minutes after take-off, the pilot detected a slight roughness or vibration in the engine. Noting that the engine oil pressure had begun to fall, the pilot advised the Sudbury Flight Service Station (FSS) of his problem and reduced engine power to 2000 rpm. About one minute later, the engine (Lycoming I0-360-B1E) stopped. The pilot advised FSS of his position and chose a straight section of highway on which to carry out his forced landing. On the base leg of the approach, the pilot noticed a truck travelling in the direction of his intended landing. As the aircraft turned on final approach, the pilot lost sight of the truck and decided to land beside the highway. On touchdown, the aircraft struck some small trees, and the right landing gear and nosewheel collapsed. Except for the highway, the countryside is covered in rock outcrops and small scrub-type trees and is unsuitable for a successful forced landing.

Examination of the engine at the accident site on the day of the accident revealed a crack in the crankcase in the area of the number 2 cylinder. There was no evidence of engine oil on the ground or on the engine oil dip-stick. The engine and aircraft fuselage were clean and did not reveal any evidence of an oil leak.

The aircraft engine was transported from the accident site to an overhaul facility where further investigation revealed that the number 2 connecting rod bearing had disintegrated and fragments of the bearing were found throughout the engine. The connecting rod had seized and failed at the crankshaft end.

.../2

DATE: 19/03/86

When the rod failed it contacted the number 2 cylinder skirt. As a result, the rod bent and jammed the number 2 piston. The broken connecting rod struck the top of the engine crankcase and cracked the case.

The pilot reported that he checked the oil quantity prior to the flight and that the dip-stick showed between seven and eight U.S. quarts. It could not be determined why there was no engine oil on the ground or in the engine oil sump. The engine main bearings were well lubricated and although the number 1, 3, and 4 connecting rod bearings were damaged, they did not show evidence of oil starvation. However, there was evidence of overheating on the crankshaft at the number 2 bearing and connecting rod.

The following laboratory report was completed: LP 112/84 - Con Rod Bolt.

FINDINGS:

Cause Related:

1. The aircraft engine seized in cruise flight when the number 2 connecting rod bearing and rod failed due to oil starvation.
2. The cause of the oil starvation could not be determined.

Other:

-- Nil --

19/03/86

CESSNA 180H C-FVSE
PINE POINT, NORTHWEST TERRITORIES
18 MARCH 1984

REPORT NUMBER: 84-W40016 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1330 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 419 | 172 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

After a successful stop-and-go landing in light cross-wind conditions, the aircraft returned to the circuit for a full stop, three point, 30-degree flap landing. During the landing roll, the aircraft began to yaw to the right. Although the left brake and rudder were applied, the aircraft continued to yaw on the snow-covered gravel runway. As the aircraft was sliding sideways, the left main gear failed. The aircraft came to rest on its left wing tip and right gear.

It was reported that prior to flight, it was necessary to depress the left brake further than the right brake, before any braking occurred. The investigation also revealed that the left tire pressure was 16 pounds per square inch (PSI) rather than the recommended 30 PSI.

The pilot had only 2 hours flying time in the last 3 months and a total of 70 hours on tail wheel aircraft. It is likely that the lack of recent experience contributed to the pilot's inability to control the aircraft in cross-wind conditions. To what extent the reported condition of the left brake contributed to the loss of control could not be determined.

As the aircraft slid sideways, the low tire pressure in the left main gear tire allowed the tire to displace so that the rim was able to come into contact with the ground. This sudden side force caused the left main gear to fail and the aircraft dropped on to the left wing.

The following laboratory reports were completed: LP 121/84, LP 122/84, LP 124/84.

.../2

19/09/85

CESSNA 150K, C-FYXJ
DES RUISSEAUX, QUEBEC
1 APRIL 1984

REPORT NUMBER: 84-Q40013 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1717 EST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 620 | 200 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The purpose of the flight was to improve the student pilot's navigational skills. With 3 hours and 15 minutes of fuel on board, the student-pilot and instructor planned to fly the 100-mile cross-country flight to the Mont-Laurier Airport to practise touch-and-go landings, and then return to Ste-Thérèse. The runway status in Mont-Laurier was not verified prior to departure.

When the pilots arrived in the vicinity of Mont-Laurier, they were unable to locate the airport, and spent the next 30 minutes searching for it. As they were unsuccessful, the instructor decided to return to Ste-Thérèse Airport.

Shortly after leaving the Mont-Laurier area, the pilots noticed that the fuel gauges indicated that the tanks were one-quarter full. Consequently, the instructor decided to carry out a precautionary landing on a paved road. After locating a suitable stretch of road, three clearing passes were conducted, and the instructor then flew a full flap approach. During the final descent, a power line, crossing the approach path, was noticed and avoided. However, an additional set of wires crossing the road at a 45 degree angle was not seen until it was too late for evasive action. The aircraft hit the wires and fell to the ground.

The investigation revealed that the tanks contained fuel for less than one hour of flight at the time of the accident.

.../2

19/09/85

The runways at the Mont-Laurier Airport were covered with snow and were unusable. The pilots did not verify the airport status prior to departure. After the search for Mont-Laurier Airport had been conducted, there was marginal fuel remaining for a return flight to Ste-Thérèse or a flight to any other suitable alternate. It is likely that the pilots were then committed to a precautionary landing. Although the pilots felt that the approach area was clear of obstacles, the second set of wires was not seen in time to be avoided.

## FINDINGS:

### Cause Related

1. The pre-flight planning did not include confirmation that the destination airport was serviceable.
2. After the pilots had searched for their destination airport, there was marginal fuel remaining for a return flight to the airport of departure.
3. During a precautionary landing on a road, a set of wires was seen too late to be avoided.

### Other

- Nil -

19/09/85

84-A40003 Cessna 421C C-GWIL

DATE: 12 Apr 1984 2010 AST
OPERATION: Private business
PLACE: Bathurst Arpt NB 47/38N 65/44W
LOCALE: Snow-covered runway 4000' by 75' 194' asl
WEATHER: Wind E 5 kt vis 2½ in snow and drizzle cloud 1000' overcast temp 0°C
PILOT: Airline Transport

| | | | | |
|---|---|---|---|---|
| TOTAL HOURS: | 3000 | ALL TYPES | 30 | ON TYPE |
| LAST 90 DAYS: | 120 | ALL TYPES | 23 | ON TYPE |

DAMAGE: Substantial
CASUALTIES: Crew: 2 uninj; pass: 3 uninj.
OCCURRENCE: The crew was attempting take-off from the 4000 foot runway which was covered with ½ to 1 inch of slush. Feeling acceleration was inadequate, the captain rejected and braked heavily, but the aircraft slid off the end. The nose gear folded after striking a ridge about 250 feet into the overrun.

The crew had flown in an hour earlier to pick up 3 passengers. It was snowing, the temperature was near freezing and the wind was light. Before taxiing out they cleared snow from the aircraft. The captain did not do any take-off performance calculations, but resolved to reject if not airborne by the halfway point; this would be difficult to establish in the dark with snow falling. He rejected when, at the normal take-off speed of 95 KIAS, he raised the nose and it dropped back to the runway. Allowing for conditions, the accelerate-stop performance of this runway was marginal. The crew did not realize until after the accident the amount of slush on the runway - enough to reduce braking action to nil. The town gives snow clearing low priority, and there is no equipment at the field. Conditions were appropriate for sweeping, but the town is not equipped for such an operation. Also, the crew's limited experience on type may have been a factor.

1. Overrun.
2. Nose gear collapse.

27/7/84

ICAO FACTORS

| | |
|---|---|
| 64C29 | Pilot - Inadequate pre-flight preparation and/or planning. |
| 64C35 | Pilot - Selected unsuitable area for take-off, landing, taxiing. |
| 80CBB | Aerodrome Conditions - Water/ice/slush on runway. |

H03

CESSNA A185E, CF-URP
FORT NELSON, BRITISH COLUMBIA
14 APRIL 1984

REPORT NUMBER: 84-W40022
LOCAL TIME: 1450 PST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2100 | 12 |
| LAST 90 DAYS | 100 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

SUMMARY REPORT:

The aircraft made a three-point landing, bounced once then rolled down the runway. A slight swing to the left was corrected using the tail wheel steering. The aircraft continued to the right then ground looped to the left about 2,200 feet from the threshold. This induced an excessive side load on the right landing gear causing it to collapse. The aircraft came to rest on the tail wheel, left main gear and right wing/fuselage.

The wind was calm and the runway had a 6400-by-200-foot asphalt surface. It was determined that the tail wheel steering system was worn. When the tail wheel was used in an attempt to correct the initial turn to the left, it remained deflected to the right. Heavy left braking was used to correct the swing to the right, and the aircraft ground looped to the left. The aircraft was loaded to maximum allowable weight and the centre of gravity was just within the aft limits. In this condition the aircraft would be difficult to bring under control once it started to ground loop. The pilot had little experience flying tail wheel aircraft.

16/10/85

.../2

FINDINGS:

Cause Related:

1. Following the landing, directional control was lost because the tail wheel steering system was worn.

2. The centre of gravity was just within the aft limits, a condition which would aggravate the aircraft's ground loop tendency.

3. The pilot had little experience flying tail wheel aircraft.

Other:

-- Nil --

16/10/85

CESSNA-180J C-FCOG
TORONTO/PEARSON INTL, ONTARIO
21 APRIL 1984

REPORT NUMBER: 84-040015 (Accident)
LOCAL TIME: 1057 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 950 | 320 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was cleared for take-off in a strong and gusty left cross-wind. During the take-off roll the Cessna began to weathercock to the left. Despite full corrective rudder input the aircraft continued to yaw into wind and began skidding to the right. The right main landing gear then collapsed under the fuselage causing the aircraft to ground loop. Damage to the gear, fuselage, engine cowling and right wing was extensive.

Although the tower had reported winds that were acceptable for take-off, the aircraft in fact encountered winds which exceeded the maximum demonstrated cross-wind limit. As the aircraft skidded sideways on the runway, the lateral force imposed on the right main gear caused it to collapse.

FINDINGS:

Cause Related:

1. During take-off the wind exceeded the maximum demonstrated cross-wind limit for the aircraft.

2. Wind information provided by the tower differed from conditions actually encountered on take-off.

Other:

- Nil - 19/09/85

DHC-1B CF-JTP
BROMONT AIRPORT, QUEBEC
23 APRIL 1984

REPORT NUMBER: 84-Q40802 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1420 EDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1250 | 620 |
| LAST 90 DAYS | 22 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

While the pilot was taxiing towards the runway, he noticed a Cessna 152 doing a run-up at the edge of the ramp. He taxied towards the aircraft planning to park beside it. The propeller of his aircraft hit the port wing tip of the stationary Cessna.

The pilot's forward visibility was hampered by the long nose of his tail-wheel aircraft. Although he was aware of the Cessna, he miscalculated the turn.

FINDINGS:

Cause Related

1. The long nose of his aircraft reduced the pilot's forward visibility.

2. The pilot miscalculated the turn and the propeller of his aircraft contacted the port wing tip of the Cessna.

Other

- Nil -

19/10/85

CESSNA 140 C-FIKV
TERRACE, BRITISH COLUMBIA
25 APRIL 1984

REPORT NUMBER: 84-P40012 (Accident)
LOCAL TIME: 1811 PST
OPERATION: Private Recreation
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 530 | 4 |
| LAST 90 DAYS | 15 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was practising touch-and-go landings on an asphalt surfaced runway. During the second circuit, the aircraft was observed to be high and steep while on final approach. As the aircraft touched down, it bounced and rose about 25 ft into the air. Without further application of power to arrest the descent, the aircraft landed hard on to the runway. The left spring undercarriage leg failed and broke off causing the aircraft to ground loop.

Investigation revealed that the spring leg failed because of overload. The leg was weakened at the location of the foot step rivet holes by pre-existing low-cycle-type fatigue cracks. Low-cycle-type fatigue indicates that the aircraft landing gear was subjected to rough service such as high landing loads and/or operation from rough air strips. The fatigue cracking intiated in the gear leg's decarburized layer, which was slightly deeper than the manufacturer's specified limit. The extent of the fatigue cracking was approximately seven percent of the total fracture surface. Cessna service letter 63-14 reported similar failures of the main landing gear on this model of aircraft and suggested an inspection of this component. This service letter was issued 22 years ago.

The following laboratory report was completed: LP 152/84.

.../2

19/09/85

FINDINGS

## Cause Related

1. No recovery from the bounced landing was made.

2. The left undercarriage spring leg failed due to overload.

3. Pre-existing fatigue cracks at the foot step rivet holes weakened the structure.

## Other

-- Nil --

19/09/85

STINSON 108-2, C-FNFJ
RIPLEY, ONTARIO
29 APRIL 1984

REPORT NUMBER: 84-040017
LOCAL TIME: 1500 EST
OPERATION: Private Recreation
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 77 | 3 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The low time pilot was landing the Stinson at a private airstrip in a left cross-wind. The aircraft was drifting to the right and became misaligned with the runway during final approach. On the roll-out, after landing long, the aircraft continued to veer off the runway and the right wing struck a tree at the far end of the strip. The pilot's limited cross-wind landing experience in a tail wheel aircraft made it difficult for him to maintain directional control on the roll-out.

FINDINGS:

Cause Related

1. Drift was not eliminated on the final approach.

2. The full length of the runway was not used for landing.

3. Directional control was not maintained on the landing roll.

4. The aircraft struck a tree on the landing roll-out.

Other

- Nil -

DATE: 09/05/85

CESSNA 190 C-GADA
KAMLOOPS AIRPORT, BRITISH COLUMBIA
29 APRIL 1984

REPORT NUMBER: 84-P40011 (Accident)
LOCAL TIME: 0921 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,300 | 75 |
| LAST 90 DAYS | 25 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the landing roll on a dry asphalt runway, in calm wind conditions, directional control was lost, and the tail wheel aircraft veered to the right. In the ensuing ground loop, the left main gear collapsed, and the aircraft came to rest on its left wing.

The investigation revealed that a poor quality weld in the main gear retaining box had failed as a result of side loads during the ground loop. No evidence could be found as to when the weld repair had been made.

FINDINGS:

Cause Related:

1. Directional control was lost during the landing roll.

2. A poor quality weld in the main gear retaining box failed.

Other:

- Nil -

19/09/85

LUSCOMBE 8E C-FVJH
STUBBS ISLAND, BRITISH COLUMBIA
08 MAY 1984

REPORT NUMBER: 84-P40013 (Accident)
LOCAL TIME: 1645 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,440 | 130 |
| LAST 90 DAYS | 200 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft had been stored on the island for five months, during which time the engine had been run on several occasions. The pilot completed a thorough pre-flight inspection which included drainage of the fuel system and an uplift of fresh fuel. Following a satisfactory thirty minute engine run-up (Continental C85-12) , the aircraft departed from a beach and circled the island while gaining altitude. At a height of about 150 ft agl, the engine rpm dropped significantly, so a precautionary landing was carried out. On short final, the airspeed decayed and the aircraft stalled and landed heavily on the beach.

The drive gear of one magneto had sheared which caused the magneto to fail. The other magneto showed signs of internal corrosion and moisture. Only partial engine power was available because of the magneto failure.

FINDINGS:

Cause Related

1. Only partial power was available because of the magneto failure.

2. On final approach, the airspeed decayed, and the aircraft stalled.

Other

-- Nil --

19/09/85

CESSNA T210L N2015S
SUSSEX AIRSTRIP, NEW BRUNSWICK
13 MAY 1984

REPORT NUMBER: 84-A40901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2150 ADT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 830 | 85 |
| LAST 90 DAYS | 60 | 60 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

En-route, the pilot requested that Air Traffic Control personnel call his wife and instruct her to place flare pots along the unlighted runway at Sussex Airport. His wife carried out the instructions and then parked the car at the end of the airstrip. She positioned the car so that the headlights shone down the runway. She had expected the aircraft to land in that direction as there was little wind; however, the pilot decided to land in the opposite direction. When the person who was in the car realized that the aircraft was landing towards her, she shut off the lights and abandoned the vehicle. The aircraft landed long and fast. Braking was poor due to the loose gravel, and the pilot was unable to avoid striking the left front fender of the car with the aircraft's left main gear. Damage to both vehicles resulted.

The pilot said that he had seen the car parked at the far end of the runway but decided to land towards it. The runway he chose sloped slightly upwards, and he felt this would compensate for the lack of head wind.

FINDINGS:

Cause Related:

1. The automobile that lighted the pilot's way was parked at the end of the runway opposite to the direction of landing.
2. The aircraft landed long and fast.
3. Braking was difficult because of the loose gravel.
4. The aircraft struck the parked car.

Other

-- Nil --

03/10/85

MOONEY M 20A N8155E
SCHEFFERVILLE AIRPORT, QUEBEC
15 MAY 1984

REPORT NUMBER: 84-Q40902 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1327 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 23800 | 120 |
| LAST 90 DAYS | 200 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During the final approach, the cockpit indications confirmed that the landing gear was down and locked. After the landing roll, the right main gear collapsed as the aircraft turned left to enter the taxiway.

The investigation determined that the landing gear had collapsed because the overcentre locking mechanism was not fully engaged. The right main landing gear retraction truss was binding against the lower spar cap of the wing which deprived the overcentre locking mechanism of the preload required for positive engagement. As the aircraft turned left, the weight was placed laterally on the right main landing gear, and it collapsed inboard. The system operates by direct mechanical linkage between the selector lever and landing gear, and the landing gear position indication is obtained from the position of the landing gear selector lever in the cockpit, rather than from the position of the overcentre locking mechanism. This situation resulted in a safe indication, when in fact the right main landing gear was not down and locked.

As the landing gear assembly was damaged, it could not be determined why the wing spar cap interfered with the rotation of the landing gear retraction truss. It is possible that the interference was the result of incorrect rigging of the landing gear or improper adjustment of the overcentre locking mechanism itself.

.../2

19/09/85

FINDINGS:

## Cause Related

1. The landing gear collapsed because the overcentre locking mechanism was not engaged.

2. The overcentre locking mechanism would not engage because a binding retraction truss restricted the landing gear extention.

3. The landing gear indication in the cockpit is obtained from the position of the landing gear selector lever, rather than from the position of the overcentre locking mechanism itself.

## Other

- Nil -

19/09/85

TAYLORCRAFT BC12-D C-FBLL
HARTLEY, ONTARIO
20 May 1984

REPORT NUMBER: 5002-84-040018 (Accident)
LOCAL TIME: 1400 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 133 | 126 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft was overweight when the pilot made his approach to a private airstrip. The round-out for landing, made just prior to touchdown, was not fully completed when the right main landing gear hit the ground hard and collapsed.

The aircraft's performance on landing was influenced by a high gross weight and a high rate of descent on touchdown, imposing an abnormal load on the right main gear.

FINDINGS:

Cause Related:

1. The aircraft was loaded in excess of its allowable gross weight.

2. The round-out for landing was incomplete.

3. The aircraft landed hard on the right main gear.

Other:

- Nil -

DATE: 9/05/85

PIPER PA-24-250 C-FQPF
HAMILTON AIRPORT, ONTARIO
21 MAY 1984

REPORT NUMBER: 84-040020 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1550 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 707 | 707 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

After completing one touch-and-go circuit, the aircraft departed the airport control zone and then returned for a full stop landing. The landing runway was under construction and the threshold was displaced 1610 feet leaving 4390 feet available for landing. The area under construction was marked with steel stakes two to three feet high.

The pilot was aware of the construction and planned his approach to land beyond the area under construction. There was no marked threshold. As the aircraft descended on final, the pilot became aware that the aircraft would touchdown short of the displaced threshold. Because of the low altitude the pilot decided to allow the aircraft to touchdown short of the construction area, apply full power and bounce over the construction before carrying out his full stop landing.

As the aircraft bounced over the stakes, about two feet of the left horizontal stabilizer was severed.

FINDINGS:

Cause Related

1. The pilot decided to let the aircraft touch down short of the displaced threshold.

2. The aircraft struck stakes in a runway construction area.

3. The displaced threshold was not marked in the standard way.

Other

- Nil -

19/9/85

CONSOLIDATED VULTEE, STINSON C-GSTG
ORILLIA AIRPORT, ONTARIO
21 May 1984

REPORT NUMBER: 84-040021 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1505 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1500 | 100 |
| LAST 90 DAYS | 30 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 0 |

SUMMARY REPORT:

At the completion of a cross country flight, the aircraft landed on the grass parallel to a runway. The aircraft touched down in a three point attitude and rolled 600 ft. As it approached the extension of the crossing runway, the brakes were applied and the aircraft nosed over. With the low fuel load that was on board, the centre of gravity was at its most forward position; thus creating a nose-heavy condition.

The combination of the forward position of the centre of gravity and the brake application resulted in the aircraft nosing over.

FINDINGS:

Cause Related:

1. The minimum fuel load on landing placed the centre of gravity position at the forward limit.

2. When the brakes were applied, the aircraft nosed over.

Other:

-Nil-

19/09/85

REPORT NO. 84-040021

## SAFETY PROGRAMS REVIEW

## AIRCRAFT OCCURRENCE REPORT

### OCCURRENCE

Stinson C-GSTG

Orillia, ontario

May 21, 1984

### ACTION TAKEN OR PROPOSED

In response to a simlar previous accident, information has been passed to CATA on landing techniques.

PIPER PA 24-250 N6754P
SUMMIT LAKE, BRITISH COLUMBIA 4 mi NW
25 MAY 1984

REPORT NUMBER: 84-W40901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0850 MDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The aircraft was en-route from California to Alaska. Following a stopover in Fort Nelson, British Columbia, the aircraft took off under visual flight rules (VFR) for Watson Lake via the Alaska Highway route. The aircraft failed to arrive at Watson Lake and a search was initiated. The wreckage was located three days later. The aircraft had struck a mountain ridge at 6,800 feet above sea level (asl), 50 feet from the top, and then tumbled several hundred feet down the mountain.

Prior to departure, the pilot had received a weather briefing which indicated that both the departure and destination points were reporting good weather. Fog and low stratus were forecast for the route but were expected to lift prior to the aircraft's departure. No pilot reports were available for the route. The weather in the area of the accident site at the time of the occurrence was observed to be cloud ceilings of 100 feet above the highway with wet snow and sleet.

Because of the location of the accident and the associated risk of avalanche, the investigators were unable to examine the wreckage. However, photographs indicate that the aircraft struck the ridge in controlled flight. It could not be determined if it was in a cruise or climbing attitude.

.../2

18/03/86

Summit Lake at 4,400 feet is the highest point on the highway route. Aircraft departing Fort Nelson which is 1,200 feet asl have to climb 3,200 feet in 92 miles. The evidence suggests that as the aircraft followed the highway toward Summit Lake, deteriorating weather was encountered. Unable to maintain visual contact the pilot likely elected to climb above the surrounding terrain. However, the aircraft struck a ridge just below the crest.

FINDINGS:

Cause related:

1. The en-route weather encountered was worse than expected.

2. The VFR flight was continued into adverse weather.

3. The aircraft struck a ridge that was obscured by cloud.

Other:

- Nil -

18/03/86

BEECHCRAFT BONANZA S35 C-GHXZ
SECHELT, BRITISH COLUMBIA 16 mi NW
26 MAY 1984

REPORT NUMBER: 84-P40019 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0205 PDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1700 | 531 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The pilot departed Vancouver on a night visual flight rules (VFR) flight to Powell River. He requested radar following from Vancouver Terminal and was tracked until the aircraft was about 10 miles west of Sechelt. At that point, air traffic control advised the pilot that the flight could not be followed any further because of the aircraft's altitude and the limits of coverage of the radar facility. The pilot acknowledged this radio transmission and requested his distance from the coastline; the controller advised him that he was just about at the coast. This was the last radio contact made with the flight. The aircraft did not arrive at its destination and was located following a search. The aircraft had crashed in a heavily wooded area at the 1700-foot level of a mountain slope while in level flight with the engine under high power.

The weather briefing which the pilot had obtained prior to departure from Vancouver indicated possible stratus clouds based around 1,000 feet above ground level with rain showers along the route.

The 0100 weather at Vancouver was broken cloud at 1,000 feet, a broken cloud layer at 2,200 feet and an overcast layer at 3,500 feet with a visibility of 7 miles in light rain. This report was issued 41 minutes prior to the departure of the flight.

... /2

The weather assessment after the occurrence indicated that the ceilings were generally 1,000 to 2,500 feet and the visibility was 5 to 12 miles in rain. However, ceilings as low as 500 feet had been reported locally, and there were also some reports of moderate rain.

On site examination revealed that the aircraft was on a heading of 335 degrees magnetic when it first struck trees on the mountain slope. It continued a further 300 feet through the trees descending slowly until it struck the ground. All major components, wing sections, and control surfaces were located between the initial tree strike and the point of ground impact. There was no evidence of failure or malfunction of the aircraft prior to the initial tree strike.

The investigation further revealed that there was a requirement for the passenger to return to Powell River that night, and that the pilot was participating in a fishing tournament in the morning. These two factors may have affected the pilot's decision to continue the flight. The pilot was not instrument rated.

The investigation determined that the pilot committed himself to continue the flight in weather that was marginal for VFR flight. The evidence indicates that when the aircraft crossed the coast, the pilot was not certain of his exact geographic location and was not aware that he was heading towards rising terrain. The fact that he did not see the trees or ground would suggest that either the visibility was greatly reduced by rain or the aircraft was in cloud.

FINDINGS:

Cause Related:

1. The weather along the route was marginal for a VFR night flight in a mountainous area.

2. The pilot did not know his location and was unaware of the mountain ahead.

3. The aircraft struck the side of the mountain at high speed and was destroyed; the occupants were fatally injured.

Other:

- Nil -

28/05/86

CESSNA 210L N59103
GRIST LAKE, ALBERTA
26 May 1984

REPORT NUMBER: 84-W40902 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1845 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (USA)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 365 | 45 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 5 |

SUMMARY REPORT:

While on downwind at 500 feet above ground, the aircraft engine (Continental IO-520-L) stopped. The pilot attempted a forced landing but was not able to reach the intended landing area; the aircraft landed in 30-to-40-foot high trees. The left fuel tank was nearly empty at the time of the accident, but reportedly, fuel was being drawn from the right tank. The selector had been moved to the full right tank, while in cruise, approximately 20 minutes before the engine stopped.

On this aircraft, each fuel tank has two supply lines which feed separate reservoirs. The design of the fuel system intends that any vapour returned to the reservoir from the engine driven fuel pump vapour separator line would pass up the front supply line, and fuel would continue to flow down the rear line to the reservoir. The investigation determined that the fuel flow through the rear fuel line from the right tank slowed to a trickle after a short time of fuel boost pump operation. The fuel flow restriction was caused by mylar particles and other material which had accumulated at a fuel line union. The source of this contaminant could not be determined.

The United States National Transportation Safety Board (NTSB) has conducted tests which have shown that when a fuel tank supply line is blocked in this fuel system, vapour builds up in the reservoir tank. Eventually the reservoir tank outlet port becomes uncovered and draws vapour instead of fuel. The result is engine power loss.

As a result of the vapour lock problem, the aircraft manufacturer changed the fuel system design and used separate vapour lines back to the fuel tanks. A non-mandatory modification kit is available but was not installed on this aircraft.

.../2

21/11/85

Because of the low circuit altitude at the time of the power loss, the pilot concentrated on the forced landing attempt and turned off the aircraft switches. If there had been sufficient time to carry out the complete engine failure check-list, including switching on the auxiliary pump, then it is possible that the engine would have restarted.

The following laboratory reports were completed: LP 198/84 Fuel Analysis, LP 210/84 Fuel Collector Tank.

FINDINGS:

Cause Related:

1. The right rear fuel supply line was blocked by mylar contaminant.
2. The source of the mylar was not determined.
3. The design of the fuel system allowed vapour accumulation in the right reservoir tank.
4. The fuel system was not modified to incorporate a separate vapour return line.
5. Vapour was drawn into the engine instead of fuel, which led to engine power loss.
6. Because of the low circuit altitude, there was not enough time to successfully restart the engine.

Other:

- Nil -

21/11/85

CESSNA 172M N80468
GRIFFIN, SASKATCHEWAN 1½ mi S
31 MAY 1984

REPORT NUMBER: 84-C40904 (Accident)
LOCAL TIME: 1045 CST
OPERATION: Private Recreation
DAMAGE: Substantial
PILOT LICENCE: Commercial (USA)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 400 | 250 |
| LAST 90 DAYS | 100 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was on a VFR flight from Minot, North Dakota to Regina. While cruising at 6500 feet, an area of reduced visibility was entered. The flight continued on course, descending as the visibility worsened. When the visibility reduced to 1 to 2 miles in blowing dust and rain, a precautionary landing was carried out on a road. Directional control could not be maintained due to a 25 knot crosswind and the aircraft left the road, nosed over and came to rest inverted in the ditch.

Although the pilot was instrument rated and the aircraft was equipped for instrument flight, he felt he did not have the necessary maps and publications to continue the flight. The weather forecast was for widespread visibility of 3 to 6 miles in blowing dust with local visibilities down to ¼ mile.

FINDINGS:

Cause Related:

1. Weather conditions were encountered that did not permit continued VFR flight.

.../2

DATE: 9/05/85

2. The crosswind, on the road used for a precautionary landing, exceeded the capability of the aircraft.

3. The aircraft left the road and nosed over in the ditch.

Other:

- Nil -

STINSON 108 C-FVME
SUDBURY AIRPORT, ONTARIO 1 mi W
02 JUNE 1984

REPORT NUMBER: 84-040025 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1215 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 193 | 80 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | 1 |

SUMMARY REPORT:

During the take-off, the Stinson settled back on to the runway twice, before it finally became airborne. It was observed in a nose-high attitude as it cleared the trees at the end of the runway. The aircraft then lost altitude, turned to the right, and the right wing struck the ground. The aircraft cartwheeled into a swampy area, 1 mile beyond the end of the runway. The emergency locator transmitter (ELT) did not activate. The pilot does not remember the accident; however, he believes that the aircraft engine lost power during the take-off.

It was determined that the aircraft was just below the maximum gross weight and that the centre of gravity was within limits. The engine was examined, and there was no evidence to indicate that it was not capable of producing maximum power. It is likely that the aircraft was forced into the air before it had reached normal take-off speed. Once airborne, there was insufficient speed to climb, and the aircraft continued in a nose-high attitude until it either stalled or flew into the ground.

The investigation revealed that the pilot, who had owned the Stinson for seven years, had little experience on type and had rarely flown the aircraft at near the maximum take-off weight. As well, he had not received any dual instruction on this type of aircraft. As a result, he was not entirely familiar with the aircraft's flight characteristics.

The ELT did not activate because the batteries were dead. They should have been replaced in January 1984.

.../2

FINDINGS:

Cause Related:

1. The pilot had accumulated little experience on type during the seven years he owned the aircraft.
2. The pilot rarely operated his aircraft at near the maximum take-off weight.
3. By maintaining a nose-high attitude with insufficient speed on take-off, a positive rate of climb could not be established, and the aircraft either stalled or flew into the ground.

Other:

1. The pilot had not received any dual instruction on his aircraft.
2. The ELT did not activate because the batteries were dead.

03/10/85

CHAMPION 7GCB C-FGOP
ST. LOUIS DE FRANCE, QUEBEC
3 JUNE 1984

REPORT NUMBER: 84-Q40026 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1645 EDT
OPERATION: Private Recreation
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 85 | 25 |
| LAST 90 DAYS | Unknown | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

While practising touch-and-go landings at a private airstrip, directional control was lost during the landing roll. The aircraft swerved to the right and struck a drainage ditch, which tore off the main landing gear.

As the control column had not been held far enough aft to keep the tail wheel in contact with the ground during the landing, maximum directional control was not available to the pilot.

FINDINGS:

Cause Related

1. Directional control was not maintained as flight controls were not operated in a manner that would produce maximum effectiveness.

Other

- Nil -

19/10/85

BEECHCRAFT C-23 C-FQPP
STE-THÉRÈSE AIRPORT, QUEBEC
05 JUNE 1984

REPORT NUMBER: 84-Q40028 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1300 EDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial

| | PILOT-IN-COMMAND | | CO-PILOT | |
|---|---|---|---|---|
| PILOT HOURS: | ALL TYPES | ON TYPE | ALL TYPES | ON TYPE |
| TOTAL | 10,000 | 250 | 211 | 108 |
| LAST 90 DAYS | 125 | 17 | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft owner and his instructor had completed a training session in the St. Hubert area and had landed there to refuel. By mutual consent, they agreed to terminate the training session, and the instructor occupied the left seat for the departure from St. Hubert. After take-off, the owner took control to gain some experience flying from the right seat. As the aircraft entered the circuit for runway 07 at St. Thérèse, the instructor was once again flying the aircraft from the left seat. He decided to simulate an engine failure by pulling the throttle back, and he then gave control back to the owner who flew the approach. While turning on to final, the owner estimated that the aircraft was too high, and as he felt uneasy, he gave control back to the instructor. The instructor decided to continue the approach and raised the flaps. The aircraft touched down hard 350 feet short of the displaced threshold, shearing off the left main landing gear.

The investigation determined that although the formal training had ceased, the instructor had decided to test his student's skill further without the benefit of a formal briefing or forewarning of the practice engine failure. The student was thus unfamiliar with the landing pattern he should fly, and although the instructor had flown the initial portion of the pattern, the student did not feel competent to conclude it. When the student relinquished control on final, the aircraft was too high for a safe landing, but the instructor attempted to salvage the approach rather than go around. The raising of the flaps created a high descent rate from which the pilot could not recover. No prior technical defects could be found in the aircraft, and the landing gear failure was purely the result of overload.

06/08/86

The following laboratory report was completed: LP 203/84 - Main Landing Gear Housing Assembly.

FINDINGS:

Cause Related:

1. The instructor did not brief the student pilot prior to the practice engine failure.
2. The student's approach pattern placed the aircraft too high on final approach.
3. The instructor, who was given control, raised the flaps and despite a poor position and high descent rate on final, did not attempt to go around.

Other:

- Nil -

06/08/86

CESSNA 150J C-FLNA
LOUISEVILLE, QUEBEC
6 JUNE 1984

REPORT NUMBER: 84-Q40029 (Accident)
LOCAL TIME: 2010 EDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 29 | 29 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The student pilot had successfully completed several touch-and-go landings in a light cross-wind. On the next landing, he had difficulty maintaining directional control during the roll-out. The pilot felt that the control problem was attributable to "wheelbarrowing" or excessive weight on the nose gear after touchdown. During the following attempt to land he kept the nosewheel off the ground for as long as possible. The aircraft veered off the runway and stopped when it hit a ditch.

The pilot was unaware of the mechanical linkage between the rudder and the nosewheel that would have allowed him to steer the aircraft if the nosewheel had been on the ground. His flight control inputs were therefore ineffective in maintaining directional control of the aircraft as it slowed down.

FINDINGS:

Cause Related

1. The pilot did not understand that the aircraft rudder controls could also provide nosewheel steering.

2. With the nosewheel off the ground during the landing roll, steering control was ineffective.

Other

DATE: 09/05/85

- Nil -

CESSNA 172M C-GVFR
CRESCENT ISLAND, BRITISH COLUMBIA
09 JUNE 1984

REPORT NUMBER: 84-P40021 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1415 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 112 | 35 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was carrying out a test flight following some maintenance he had performed on the engine. The aircraft struck the top wire of hydro transmission lines which were strung across the Fraser River. The unmarked wire was 89 feet above the surface of the river. The aircraft dropped into the river, and the pilot was rescued by nearby fishermen.

Witnesses on the river bank saw the aircraft flying at approximately 50 feet above the water. They were waving at the pilot, and he was waving back just before the wires were struck by the aircraft. The pilot pulled the aircraft up rapidly in a last-minute attempt to get over the obstruction, but he was unsuccessful. The wires had not been observed in time to take sufficient evasive action. At the low operating altitude of the aircraft, the wires were difficult to see, and the towers on the river's edge were obscured by trees.

FINDINGS:

Cause Related:

1. The aircraft was operated at an altitude below local obstructions (wires).

2. The wires were not observed in time to take evasive action.

Other:

-- Nil --

21/11/85

DOVE AIR
CESSNA 188A C-GEBH
VIRDEN, MANITOBA
11 JUNE 1984

REPORT NUMBER: 84-C44022 (Incident)
INFORMATION SOURCE:
LOCAL TIME: 0830 CDT
OPERATION: Private Aerial Spray
DAMAGE: Minor
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,266 | 350 |
| LAST 90 DAYS | 9 | 7 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | |

SUMMARY REPORT:

After his fifth spray run, the pilot turned left on his pull-up. Aware that he was about to collide with a power line, he attempted to dive underneath the wire, but collided with a second smaller line across his flight path. A precautionary landing was carried out in a farmer's field.

The pilot had made four runs in a west to east direction crossing a transmission line at the start and pulling up to the left at the completion of each run. The pilot was aware of the two power lines; however, the fifth pass was in the opposite direction and a turn to the right was required to avoid the wires.

FINDINGS:

Cause Related:

1. A left turn was initiated rather than a turn to the right at the completion of the spray run.

Other:

- Nil -

19/09/85

CESSNA 177 C-GOXO
BLIND BAY, BRITISH COLUMBIA
13 JUNE 1984

REPORT NUMBER: 84-P44008 (Incident)
LOCAL TIME: 1730 PDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 40 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The pilot was landing on a 1,900-foot runway which was surrounded by tall trees. On touchdown following a steep approach, the aircraft bounced twice. When the pilot attempted to overshoot, the aircraft struck a tree to the right of the departure path. The right wing was damaged, but the aircraft was landed safely following the next approach.

The first approach was high and fast, and the aircraft landed half-way down the runway. After the first bounce, power was applied for another touchdown. Following the second bounce, the pilot realized that there was not enough runway remaining for a safe stop. The engine power was slowly applied for an overshoot, but the aircraft was unable to clear the trees on the departure path.

FINDINGS:

Cause Related:

1. Because the approach was high and fast, the aircraft landed half-way down the short runway.

2. The initial touchdown attempt resulted in a bounced landing.

3. The overshoot was delayed.

Other:

- Nil -

19/09/85

GRUMMAN AAIB, C-GMRD
OKANAGAN FALLS, BRITISH COLUMBIA 12 MI E
15 JUNE 1984

REPORT NUMBER: 84-P40022 (Accident)
LOCAL TIME: 1000 PDT
OPERATION: Private - Other
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 376 | 300 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | - |

SUMMARY REPORT:

The pilot and his passenger were searching for a stray horse in mountainous terrain. After entering a canyon, the pilot realized that the aircraft could not outclimb rising ground or be turned around in the space available. He attempted to land straight ahead on the edge of a logging road, but just before touchdown the left wing struck two trees and separated from the fuselage. The aircraft, which remained upright, landed heavily on the road embankment.

The canopy would not slide open due to distortion of the fuselage by impact forces. The occupants were able, with difficulty, to break through the canopy and evacuate the wreckage. There was no fire on impact.

The flight required low level, slow manoeuvres in mountainous terrain. The pilot was inexperienced in this type of flying; the low-powered aircraft became trapped by steeply rising ground. The situation may have been aggravated by downdrafts associated with an unstable air mass over the area.

.../2

DATE: 9/05/85

FINDINGS:

Cause Related:

1. The conditions of the flight exceeded the experience level of the pilot.
2. The aircraft was placed in a situation where it could not out-climb rising terrain.
3. An unstable air mass with associated downdrafts, was over the area at the time of occurrence.

Other:

1. The canopy would not slide open due to distortion of the fuselage, which caused a delay in the evacuation of the wreckage.

# ERRATUM

Note: That pages 149 and 151 have inadvertently been transposed

CESSNA T210L N210DE
WINNIPEG, MANITOBA
24 JUNE 1984

REPORT NUMBER: 84-C40905 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1015 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (U.S.A.)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 600 |
| LAST 90 DAYS | 30 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

## SUMMARY REPORT:

While on a final approach, the pilot noticed an unsafe landing gear indication from the indicator light. The pilot discontinued the approach and then flew the aircraft by the tower twice to obtain a visual check of the gear. When the pilot was informed that everything appeared normal, she carried out a landing. At the end of the landing roll, the brakes were applied, and the nose gear collapsed.

An extensive examination of the landing gear system did not reveal why the nose gear failed to mechanically lock in the down position.

## FINDINGS:

### Cause Related:

1. The nose gear did not mechanically lock in the down position for undetermined reasons.

2. The nose gear collapsed during the landing roll.

### Other:

- Nil -

10/12/85

FINDINGS:

Cause Related:

1. The pilot was inexperienced on type.
2. A steep approach was carried out in a calm wind.
3. The aircraft landed long, and there was insufficient runway remaining to go around safely.
4. The aircraft became airborne in a nose-high attitude which caused the aircraft to fly in ground effect in a near-stalled or mush condition until it struck the highway embankment.

Other:

-- Nil --

18/03/86

CESSNA 170B CF-1CW
GORRIE, ONTARIO 1 mi E
16 JUNE 1984

REPORT NUMBER: 84-040026 (Accident)
LOCAL TIME: 2020 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 186 | 9 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | 1 | - |
| OTHER | 2 | - | - |

SUMMARY REPORT:

The pilot was observed making a steep approach to a grass strip. Trees obscured the observer's view of the final approach. The aircraft was next seen a short distance from a highway, airborne in a nose-high attitude. It struck the embankment of the highway and then hit an automobile that was travelling along the highway. The aircraft rolled down the embankment on the far side of the highway and came to rest in an inverted position. The pilot of the aircraft and the two occupants of the automobile were killed.

The grass strip, which is 1,700 feet long, is located at right angles to a highway. The highway is 600 feet from the end of the strip. The weather was clear, and the winds were calm.

The investigator concluded from the wheel marks on the strip that the aircraft initially touched down approximately 1,200 feet beyond the threshold of the runway. It travelled a short distance, became airborne, and briefly touched down again before striking the highway embankment. From the position of the flaps, the engine controls, and the switches, it was concluded that the pilot was attempting a go-around after the initial touchdown.

In a no-wind condition, a steeper than normal approach was carried out resulting in a long landing. The pilot, who had little experience on type, then attempted a go-around with insufficient runway remaining to take off safely. The aircraft became airborne in a nose-high attitude which caused the aircraft to fly in ground effect in a near-stalled or mush condition until it struck the highway embankment.

... /2

18/03/86

CESSNA 182A C-FJHW
ROCKINGHORSE RANCH, BRITISH COLUMBIA
24 JUNE 1984

REPORT NUMBER: 84-P40024 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1715 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,000 | 700 |
| LAST 90 DAYS | 40 | 40 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

The aircraft, involved in dropping parachutists, approached the drop zone at 9,500 feet. The jumpmaster unstrapped and positioned himself to exit the aircraft. As he did so, the release handle of his reserve parachute caught on the door flange, deploying the parachute outside the aircraft. The jumpmaster, realizing what had happened, left the aircraft and was dragged off into the horizontal stabilizer where the reserve chute had become entangled. After striking the stabilizer, he fell clear of the aircraft. Although damaged, the reserve parachute was able to land the jumpmaster safely.

The aircraft sustained damage to the horizontal stabilizer but remained controllable and landed without further incident.

FINDINGS:

Cause Related:

1. The jumpmaster's reserve parachute was accidently deployed when it caught on the door flange.

2. The jumpmaster struck the horizontal stabilizer as he left the aircraft.

Other:

- Nil -

21/11/85

PIPER PA 28-181 C-GPJS
THURSTON LAKE, ALBERTA
25 JUNE 1984

REPORT NUMBER: 84-W40038 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 10:00 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 800 | 250 |
| LAST 90 DAYS | 55 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The pilot and three passengers were flying into a 3,000-by-100-foot dirt airstrip near a fishing location. The touchdown on the airstrip was two-thirds of the way down the runway. When the pilot felt that the aircraft could not be stopped on the remaining runway, he elected to go around. During the overshoot, the right wing struck the tops of 25-foot trees on the north side of a curved taxiway which led from one end of the airstrip in the same general heading as the runway. The aircraft then stalled and hit the ground. The right wing, right main gear, and nose gear were torn off. The fuselage of the aircraft spun around and skidded backwards along the taxiway.

The pilot had intended to land about half-way down the runway to avoid areas of the airstrip that appeared wet. The landing was made with a slight tail wind and the runway sloped down; these factors caused the long touchdown. During the landing roll, the flaps were left in the full down position which did not allow maximum braking. When the overshoot was carried out, the flaps were reselected to the one-notch position. The pilot attempted to avoid the trees at the end of the runway by following the curved taxiway, but the aircraft was unable to clear the obstructions.

.../2

28/05/86

FINDINGS:

Cause Related:

1. The aircraft was landed long on the runway.
2. The aircraft could not be stopped on the remaining runway.
3. An overshoot was attempted with insufficient unobstructed area available and the aircraft struck trees.

Other:

-Nil-

28/05/86

TAYLOR CRAFT BC12D C-FIXW
LAKE SUPERIOR, ONTARIO
26 JUNE 1984

REPORT NUMBER: 84-C40039 (Accident)
LOCAL TIME: 1501 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 854 | 400 |
| LAST 90 DAYS | 35 | 35 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the take-off run, the float-equipped aircraft rolled right, flipped over, and came to rest inverted.

The area used for the take-off was the unprotected, windward side of an island, and there were heavy swells present. The take-off was attempted across these swells, and the resultant pounding caused alternating loads in tension and bending on the right float cross bracing wires. Three of the four wires failed in successive overload and the right float gear failed, causing the aircraft to roll over.

FINDINGS:

Cause Related

1. The water conditions in the area and the direction chosen for the take-off were unsuitable.
2. The force of the swells against the aircraft resulted in overload failure of the right float cross bracing wires.

Other

- Nil -

19/09/85

ROY LINGEN INC.
BEECH M35 C-FDXM
ROSSEAU, ONTARIO 5 mi S
30 JUNE 1984

REPORT NUMBER: 84-040033 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1500 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,600 | 700 |
| LAST 90 DAYS | 20 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During the landing roll, the nose gear collapsed. The nose settled on the grass, then the aircraft skidded to a stop.

Laboratory examination of the nose gear assembly established that the V-brace lugs that are attached to the actuating rod failed when they were subjected to an overload. This type of failure is consistent with the nose gear overcentre lock not being in the locked position. This condition places an overload on the landing gear actuating rod when the landing gear assembly is subjected to the weight of the aircraft during landing.

It was not determined why the overcentre lock was not in the locked position. The aircraft had been inactive for some time, and it is possible that the lubrication in the system had dried out causing the mechanism to seize.

FINDINGS:

Cause Related:

1. The overcentre lock did not lock in position when the landing gear was extended resulting in an overload failure of the V-brace lugs.

Other:

-- Nil --

16/10/85

CESSNA 180D, CF-NSL
FORT MCPHERSON, N.W.T. 32 mi SW
29 JULY 1983

REPORT NUMBER: 83-W30036
LOCAL TIME: 1750 MDT
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 840 | 468 |
| LAST 90 DAYS | 101 | 101 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The first leg of the proposed VFR flight from Tuktoyaktuk to Whitehorse ended in Inuvik where the pilot refuelled his amphibious aircraft. Departure time from Inuvik for Dawson City, the next refuelling point, was 1643 mountain standard time (MST). The aircraft did not arrive at destination.

The crew of an aircraft northbound to Inuvik on the afternoon of occurrence reported sighting a blue and white Cessna floatplane about 30 mi south of Ft. McPherson. They said it was flying on top of a low cloud layer, heading southwest toward worsening weather. In that area cloud layers extended from approximately 3000 to 12000 feet asl, resulting in ceilings of 0-500 ft over rising terrain with visibility frequently reduced to 0-2 mi in fog. Conditions at Inuvik were still VFR. Poor weather and the absence of an ELT signal hampered the search, but the wreckage was located 2 days later 32 mi southwest of Ft. McPherson. The aircraft had flown into a 4000 ft mountain at the 3000 ft level.

Records showed that the aircraft flew 132 hrs since its last documented inspection; inspections were required after every 100 hrs of flight.

.../2

DATE: 09/05/85

There was no evidence of pre-impact systems failure or mechanical/structural malfunction. The ELT could not activate because the battery was dead (time expired) and the inertia switch was defective. When found, the selector switch was in the "OFF" position.

The pilot was licensed to fly single-engine land aeroplanes under 4000 lbs gross weight, day VFR only. According to his log book, he had accumulated 140 hrs of flight time in twin-engine aircraft and had flown machines which exceeded the 4000 lb weight category. There is no evidence that he had received any instrument flight training.

The pilot and his passenger were flying to Whitehorse in order to attend a family funeral. This may have induced pressure to continue the flight regardless of the weather.

FINDINGS:

Cause Related:

1. VFR flight was continued into a mountainous area obscured by low cloud and fog.

Other:

1. The aircraft was not certified or maintained in accordance with existing regulations.
2. The ELT was not serviceable; the switch was found in the "OFF" position.
3. The pilot had accumulated flight time in aircraft for which he had no endorsement.

CESSNA U-206F C-GVQG
BATISCAN RIVER, QUEBEC
14 AUGUST 1983

REPORT NUMBER: 83-Q34064 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1015 EDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 249 | 140 |
| LAST 90 DAYS | 58 | 58 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The pilot of the float-equipped aircraft was accompanied by three family members on a flight to the family fishing camp. As he began the approach to his destination, one of his passengers became ill, and the pilot decided to land immediately. The aircraft touched down close to the shore and ran up on the shoreline.

The pilot was distracted by his sick passenger and made a steep approach at a higher than normal airspeed. Because of the high speed, the aircraft floated in ground effect and landed beyond the pilot's intended touchdown point.

FINDINGS:

Cause Related:

1. During the approach, the pilot became distracted when one of his passengers became ill.
2. The approach was conducted at a higher than normal airspeed; as a result, the aircraft floated in ground effect, touched down long and ran up on the shore line.

Other:

- Nil -

06/08/86

TRANSPORT DES MONTS AVIATION LTÉE
LAKE 4-200, CGLOV
LAC PRIVERT, QUEBEC
26 AUGUST 1983

REPORT NUMBER: 83-Q30058 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0740 ADT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,550 | 323 |
| LAST 90 DAYS | 24 | 24 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

After take-off, the aircraft proceeded towards a caribou hunting area. About an hour later, an electronic locator transmitter signal was received, and an air search was implemented. The aircraft was found five hours later in a large lake. Weather observation at the time of the accident showed that the area was under the influence of low ceilings and fog. Two pilots, who were in the vicinity at the time of the accident, confirmed the weather situation.

The investigation determined that there was no mechanical deficiency that might have contributed to the accident. It is believed that the flight continued into deteriorating weather and that the pilot may have lost visual reference with the surrounding terrain and crashed into the lake.

FINDINGS:

Cause Related:

1. Undetermined.

Other:

-Nil-

19/09/85

CESSNA A185E C-FSSX
CLAIR LAKE, QUEBEC
24 SEPTEMBER 1983

REPORT NUMBER: 83-Q30067 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0815 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 460 | 145 |
| LAST 90 DAYS | 13 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

The pilot delayed the early morning landing until some of the fog had burned off the lake. Although the visibility was still restricted by fog, he made a glassy water approach. As the aircraft landed, it suddenly started to roll laterally, and directional control could not be maintained. The right wing tip and float dug into the water, and the aircraft waterlooped. Although substantially damaged, the aircraft remained upright and was taxied to the shore. A flying wire was found loose after the accident.

The pilot lacked recent experience with glassy water operations. Also, the damage was consistent with a heavy landing from which a loss of directional control resulted, and the aircraft waterlooped.

The loose flying wire was due to a failed left front streamline wire attachment fitting (commonly called a wire pull). Laboratory examination showed that the wire pull fitting had failed because of overload. There was no evidence to indicate that this failure was present prior to the accident; but, rather that the wire pull fitting failed as a result of a lateral load exerted on the floats during the waterloop.

Further laboratory examination of the wire pull fitting revealed that the material properties were substantially below those specified by the manufacturer. In addition, the fitting was not identified as a manufacturer's approved part. (Note: The following laboratory report was completed: LP 59/84).

19/11/85

FINDINGS:

Cause Related:

1. Visibility was restricted by fog during a glassy water landing.

2. The pilot lost directional control after a hard landing.

Other:

1. The wire pull fitting failed as a result of a lateral load that was exerted on the floats during the waterloop.

2. The wire pull fitting was not a manufacturer's approved part.

3. The material properties of the fitting were found to be substantially below those specified by the manufacturer.

19/11/85

CESSNA 180K C-FSGT
FISHERMAN'S COVE, BRITISH COLUMBIA
2 OCTOBER 1983

REPORT NUMBER: 83-P34037 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1220 PDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,150 | 1,000 |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The float-equipped aircraft was attempting to land on the water just outside Fisherman's Cove. The base leg was over a yacht-congested cove. While on final approach approximately 100 feet above the water, the pilot failed to see the hydroelectric lines strung across the aircraft's flight path. The aircraft struck the wires which broke on impact. Directional control was maintained, and the pilot carried out the landing successfully. The aileron sustained minor damage from the wire strike. Because the wires broke immediately, further damage to the aircraft was prevented.

Fisherman's Cove itself is extremely congested with vessels, a large moorage area, and a refuelling dock, and is therefore unsuitable for seaplane operations. However, aircraft occasionally land just outside of the cove, a procedure which takes the landing circuit over the cove and very near the unmarked wires.

FINDINGS:

Cause Related:

1. The unmarked hydroelectric lines over the cove are hazardous to aircraft passing over the wires in order to land just outside the cove.

Other:

-- Nil --

02/04/86

CESSNA 185F C-GEQR
OKOTOKS, ALBERTA 2 mi W
15 OCTOBER 1983

REPORT NUMBER: 83-W30061 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1730 MDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,240 | 1,000 |
| LAST 90 DAYS | 140 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The float-equipped aircraft was flown from a lake for a landing on a field where the floats were to be replaced with wheels. The field had received a light covering of snow the night before, and the ground was reported to be frozen. On touchdown, the floats dug into the earth which resulted in a rapid deceleration. The pilot applied full power to give maximum elevator control to hold the nose up but was unsuccessful. The tail came up, and the aircraft nosed over.

The practice of landing float-equipped aircraft on snow-covered ground is not uncommon at the end of the float season when the floats are to be replaced by wheels or skis. The power that is required to provide sufficient download on the elevators to prevent the aircraft from nosing over will vary with the friction co-efficient of the landing surface. If the landing area is soft, the rate of deceleration will be high, and the aircraft may nose over despite the use of maximum power.

.../2

28/05/86

Although the surface temperature was estimated by the pilot to be below freezing, the ground was less firm than anticipated. Most of the snow that had fallen the night before had melted during the day, thereby rendering the field unsuitable for the landing attempt on floats. The pilot, although well qualified on type, had not previously landed a float-equipped aircraft on land. He therefore lacked experience in judging the suitability of a particular field for landing on floats.

## FINDINGS:

### Cause Related:

1. The area chosen for the float landing was too soft, and therefore unsuitable for this type of operation.

2. The pilot was inexperienced in operating a float-equipped aircraft on land.

### Other:

-- Nil --

28/05/86

CESSNA 180A, C-FJQZ
SIOUX LOOKOUT, ONTARIO
6 JANUARY 1984

REPORT NUMBER: 84-C40002
LOCAL TIME: 1106 CST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1101 | 220 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was on a local flight to test a recently installed ski assembly and to provide recurrency training. During landing on a snow packed runway, the aircraft was observed to swing to the right; the left wing dropped and struck the runway surface. The aircraft then swung to the left and came to rest on the runway. The left gear leg was torn loose from the fuselage.

This was the eighth landing of the flight. The previous seven landings were carried out at a nearby ski base with no problems reported.

The manner in which the gear attachment bracket failed indicated that it had been damaged prior to the accident.

FINDINGS:

Cause Related:

1. The left gear failed at the attachment point shortly after landing on the snow covered runway.

2. The attachment had been weakened prior to the accident.

Other:

-- Nil --

DATE: 09/05/85

CESSNA 180B, C-FLGB
INNISFAIL, ALBERTA
28 JANUARY 1984

REPORT NUMBER: 84-W40004 (Accident)
LOCAL TIME: 1650 MST
OPERATION: Private Recreational
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 278 | 225 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

Three hours before departing Wizard Lake for Calgary, the pilot obtained a weather briefing by phone. He was advised that conditions enroute were generally suitable for visual flight but there was a possibility of precipitation in the form of rain. Rain was falling in the Wizard Lake area when the aircraft took-off at about 1610 MST.

At 1650, a man at his home southeast of Innisfail heard the sound of an aircraft engine, then a "thud". He searched the immediate area on snowmobile, but visibility was reduced by blowing snow and he was unable to locate the source of the noise. He later joined an RCMP search party; the wreckage was found just after midnight. The ELT switch was found to be in the off position and batteries were time expired by 6 months.

Investigation revealed that the aircraft struck the ground at high speed in a left-wing-low attitude, consistent with a spiral dive. Examination of the wreckage disclosed no pre-impact failures or malfunctions. The pilot was not instrument rated and there was no evidence that he had received any instrument flight training. The aircraft was not equipped for flight in icing conditions. At the time of occurrence a local snow squall had created conditions which were below VMC and conducive to airframe icing. The weather conditions encountered were worse than briefed to the pilot.

.../2

DATE: 09/05/85

FINDINGS:

## Cause Related:

1. The enroute weather conditions were worse than forecast.
2. VFR flight was continued into conditions below VMC.
3. The weather conditions encountered exceeded those for which the pilot was licensed and the aircraft equipped to fly.

## Other:

1. The ELT batteries were time expired by 6 months.
2. The ELT switch was found to be in the "off" position.

84-A40002 Champion 7GCB C-FNYY

DATE: 15 Feb 1984 1300 NST
OPERATION: Private recreation
PLACE: Springdale Nfl 49/25N 56/10W
LOCALE: Snow-covered farm field
WEATHER: Wind W 10 kt vis unlimited sky clear
PILOT: Private

| | | | | |
|---|---|---|---|---|
| TOTAL HOURS: | 1400 | ALL TYPES | 20 | ON TYPE |
| LAST 90 DAYS: | 40 | ALL TYPES | 15 | ON TYPE |

DAMAGE: Substantial
CASUALTIES: Crew: 1 uninj; pass: 1 uninj.
OCCURRENCE: After selecting an area on his property, the pilot landed his ski-equipped aircraft. After touching down, the right ski struck a rock covered by snow. The right gear collapsed and the aircraft came to rest on its right side and nose.

1. Collision - rock.
2. Gear collapsed.

11/6/84

ICAO FACTORS

64A35 Pilot - Selected unsuitable area for take-off, landing, taxiing.

H18

CESSNA 180 CF-KOF
MIMINISKA LAKE, ONTARIO
28 FEBRUARY 1984

REPORT NUMBER: 84-C40015 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1430 EST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 5000 | 1500 |
| LAST 90 DAYS | 150 | 150 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot landed his ski-equipped aircraft on a snow-covered lake. The snow had drifted and was packed into a hard, uneven surface. When the aircraft touched down the impact forces transmitted from the right main landing gear ski caused the ski axle to fail due to overload. Subsequent dragging of the right main landing gear wheel caused the aircraft to ground loop; the left wing tip struck the surface. The aircraft came to rest in an upright position.

FINDINGS:

Cause Related:

1. The ski assembly axle broke due to impact forces from the hard, uneven surface.

2. Directional control was lost as the wheel dug into the snow.

Other:

- Nil -

DATE: 19/09/85

LUSCOMBE 8E C-FNEU
LAC PIVELE, QUEBEC
11 APRIL 1984

REPORT NUMBER: 84-Q40015 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1630 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 347 | 20 |
| LAST 90 DAYS | 11 | 11 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The pilot and a friend departed in the late afternoon for an overnight fishing trip. Several friends and relatives knew of their intentions but no one knew their destination; no flight plan was filed. When they failed to return the following day, a friend conducted an aerial search and found the wreckage of the aircraft on the frozen surface of a lake.

The investigation revealed that the aircraft had struck the surface in a right-wing-low, nose-down attitude. The right wing tip made contact first followed simultaneously by the two skis and the engine. The aircraft then cartwheeled on to the left wing and slid 50 feet before coming to rest.

No mechanical deficiencies were found when the wreckage was examined. Medical evidence revealed that both the pilot and passenger had blood/alcohol levels of 0.14 and 0.13 per cent respectively. According to the police laboratory guide for the interpretation of blood/alcohol levels, there is a high probability that a person's faculties would be affected by these levels.

The attitude of the aircraft at the time of impact and the short wreckage trail indicate that the aircraft stalled at a low altitude.

... /2

06/08/86

FINDINGS:

Cause Related:

1. The pilot had a blood/alcohol level of 0.14 per cent.
2. The pilot's faculties were probably affected by the high concentration of alcohol.
3. The aircraft was allowed to stall at low altitude.

Other:

1. The passenger had a blood/alcohol level of 0.13 per cent.

06/08/86

PIPER PA-18A CF-WWG
GERMANSEN LANDING, BRITISH COLUMBIA
7 MAY 1984

REPORT NUMBER: 84-P40014 (Accident)
LOCAL TIME: 1630 PDT
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 205 | 15 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the landing, a turn to the right was initiated to avoid contact with exposed mud banks. The right float caught the water, dug in, and flipped the aircraft over.

The landing area in the river is about 3,000 ft long and less than 300 ft in width with an island at one end and a bridge at the other. In addition, the river bends in the middle of the landing area. Mud banks, located just before this bend, became exposed at low water levels, further reducing the manoeuvring area.

The pilot had a total of 160 hours experience on float-equipped aircraft, and he was familiar with the landing area. The approach flown resulted in a long touchdown too close to the mud banks.

Although life-vests were available, neither the pilot nor the passenger were wearing them, and they were not donned prior to exiting the aircraft.

FINDINGS:

Cause Related

1. Mud banks, due to low water levels, had reduced the manoeuvring area.

2. The approach flown resulted in a long touchdown.

3. The right float struck the water during a turn to avoid the mud banks.

Other

1. Life-vests although available were not worn.

19/09/85

CESSNA 180, CF-ITI
KLOTZ LAKE, ONTARIO
18 MAY 1984

REPORT NUMBER: 84-040022
LOCAL TIME: 1650 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 330 | 17 |
| LAST 90 DAYS | 20 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 2 |

SUMMARY REPORT:

The Cessna 180 on floats was making a cross-wind approach in strong gusty conditions on a narrow lake. With the left wing low to compensate for drift, the aircraft touched down nose high and just above stall speed. The aircraft bounced back into the air, yawed to the left, rolling right at the same time. On the second touch down the right float dug in pitching the nose down and causing the right wing to strike the water. The aircraft righted itself and remained afloat. After restarting the engine, which had stalled when the aircraft had nosed into the water, the aircraft was taxied to the shoreline.

Following the accident, examination of the aircraft's records revealed that the check sheet used to carry out the last 100-hour inspection did not agree with the check sheet issued by Cessna for the 180 series.

FINDINGS:

Cause Related

1. A cross-wind landing was attempted on rough water.

2. On touchdown directional control was lost in gusty wind conditions.

Other

The check sheet used for the last 100-hour inspection was not an approved check sheet.

DATE: 9 April 1985

CESSNA 185F CF-HRX
PRINCE GEORGE, BRITISH COLUMBIA 60 NM SW
19 MAY 1984

REPORT NUMBER: 84-P40018 (Accident)
LOCAL TIME: 1600 PDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 14000 | 4000 |
| LAST 90 DAYS | 10 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The float-equipped Cessna 185 was departing from a small lake, located approximately 3400 ft asl and surrounded by high tree-covered terrain. Unable to accelerate or climb, the aircraft closed with the rising terrain. The passengers were briefed of the impending crash and the aircraft carried out a forced landing in the trees. All four occupants escaped without injury.

The aircraft, with 20° of flap selected, took off to the WSW. In this direction the take-off distance available was 4750 ft. The winds were out of the west at 25kt. The take-off and climb to 35 ft. were normal but as the aircraft approached the edge of the lake, rising ground and turbulence were encountered. A climb could not be established. The flaps were selected up but this did not help; so they were reselected to 20°.

The aircraft's take-off weight was below the maximum permitted. The take-off distance available was greater than the published required length. Selection of the flaps to the up position prior to clearing all obstacles is contrary to the aircraft manufacturer's recommended procedures. This flap selection, combined with wind shear, which was created by the orographic turbulence, prevented the aircraft from climbing over the terrain.

19/09/85

.../2

FINDINGS:

Cause Related:

1. Strong winds and rising terrain were conducive to wind shear conditions.
2. A rate of climb sufficient to clear the rising terrain was not established.
3. The flaps were retracted prior to clearing rising terrain, contrary to the manufacturer's recommended obstacle clearance procedures.

Other:

-- Nil --

19/09/85

CESSNA 180G, C-GACT
DEADMAN'S POND, GANDER, NEWFOUNDLAND
21 MAY 1984

REPORT NUMBER: 84-A40009
LOCAL TIME: 1230 NDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 200 | 55 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The aircraft had completed one touch-and-go landing to the glassy water surface. During the second approach the aircraft was initially too high on final so the steepness of the descent path was increased. In the flare the aircraft touched down on the forward section of the left float, skipped onto the right float and then back onto the left float. Directional control was lost, the left wing struck the water and the aircraft came to rest inverted.

This was the pilot's first flight since the fall of the previous year. Standard techniques were not used for a glassy water approach and landing.

FINDINGS:

Cause Related

1. During a glassy water landing, control of the aircraft was lost.

Other

1. The pilot had not flown since the previous fall.

DATE: 9 April 1985

PIPER PA 18 C-GMSA
MCNEIL LAKE, YUKON
2 JUNE 1984

REPORT NUMBER: 84-W40032 (Accident)
LOCAL TIME: 1430 YST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,800 | 1,700 |
| LAST 90 DAYS | 25 | 25 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After take-off from a mountain lake, in gusty wind conditions, the pilot raised the flaps and accelerated to climb speed. At an altitude of 20 to 30 feet, the aircraft suddenly dropped back on to the water. The aircraft hit nose first and yawed to the right. The left wing struck the water and the aircraft came to rest in an inverted position. The pilot managed to escape uninjured.

The departure lake, which was three miles long and one mile wide and at an elevation of 3,000 feet, was surrounded by 4,000-to-6,000-foot hills. The location of the lake between the hills would cause a funnelling effect that would generate turbulence and wind shear in gusty wind conditions.

The turbulence and wind shear caused a rapid loss in altitude at a critical phase of the take-off attempt.

FINDINGS:

Cause Related:

1. Gusty wind conditions, accompanied by turbulence and wind shear, caused a sudden loss of control shortly after take-off.

Other:

-Nil-

18/03/86

CESSNA 180H N3420Y
DETROIT RIVER, WINDSOR, ONTARIO
09 JUNE 1984

REPORT NUMBER: 84-040901 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1320 EDT
OPERATION: Private Ferry
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 560 | 350 |
| LAST 90 DAYS | 80 | 75 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was ferrying his aircraft from Canada to the United States and had planned an enroute stop at Detroit, Michigan to clear Customs. As the pilot was landing on the Detroit River, a boat crossed the approach path of the aircraft. The left float struck the boat's wake with force sufficient to split the float; thus destroying its structural integrity. Although the aircraft rolled on to its left side, the pilot was able to turn the aircraft and taxi to the Canadian shoreline. The aircraft sank in the water near the shore.

Investigation revealed that the pilot had flown the aircraft to a Canadian airport where he had purchased floats. After the wheels were removed and the floats installed, the pilot received two hours of dual instruction, and his pilot's log book was endorsed for solo float operations.

The floats were about 17 years old. They were constructed of fiberglass and appeared to have been repaired in several areas. The strength and integrity of the floats prior to the accident could not be determined. The installation had not been certified, and a weight and balance and equipment list amendment had not been prepared for the aircraft.

19/09/85

## FINDINGS

Cause Related:

1. During a landing, the left float was structurally damaged when the aircraft struck the wake of a passing powerboat.

2. The pilot was inexperienced in float plane operations.

Other:

1. The float installation had not been certified.

2. Weight and balance and equipment list amendments had not been prepared for the aircraft.

19/09/85

PIPER J3 CF-JWF
MCCAULEY LAKE, ONTARIO
11 JUNE 1984

REPORT NUMBER: 84-C40033 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1815 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 280 | Unknown |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The float-equipped aircraft was approaching the lake for a landing. The pilot pulled up and entered a turn to avoid boat traffic on the surface. During the pull-up at a reported speed of 70 mph, the aircraft stalled and began to lose altitude rapidly. Power was applied, but the aircraft continued to descend and crashed into a swampy area.

There was no valid Certificate of Airworthiness. The pilot's medical had expired, which therefore, invalidated his pilot's licence. On board, there was no journey log book, Certificate of Registration, Certificate of Airworthiness, or flight crew licence. The log book had not been maintained in accordance with regulations.

FINDINGS:

Cause Related:

1. Sufficient airspeed to sustain flight was not maintained during the pull-up.

Other:

1. A number of the regulatory requirements that relate to the safe operation of aircraft had been ignored.

21/11/85

LE GROUPE DU BARRY INC.
CESSNA 150K C-FTRL
LAC DE L'ARGILE, QUEBEC
11 JUNE 1984

REPORT NUMBER: 84-040033 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1900 EDT
OPERATION: Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 302 | 05 |
| LAST 90 DAYS | 18 | 10 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The ambient conditions were conducive to carburettor icing. As the pilot taxied 1 mile on the lake, he carried out pre-take-off checks and verified the proper operation of carburettor heat. The take-off and initial climb were conducted without the use of carburettor heat. At 800 feet above ground level, the engine rpm decayed rapidly. The pilot was unable to maintain level flight, and the aircraft hit some trees and fell to the ground.

The technical investigation revealed that there was no mechanical failure of the engine and that no symptoms of such a failure were reported by the pilot.

Without the use of carburettor heat, the combination of the weather conditions and the lengthy taxi on the water likely resulted in the development of carburettor icing. Shortly after take-off, engine performance degraded rapidly, and the pilot was forced to perform an emergency descent into the trees.

FINDINGS:

Cause Related:

1. Ambient conditions conducive to carburettor icing were present.

2. Precautions to prevent carburettor icing were not taken.

Other:

-Nil -

19/11/85

CESSNA 172A, C-FKSX
THOR LAKE, ONTARIO
20 JUNE 1984

REPORT NUMBER: 84-040027 (Accident)
LOCAL TIME: 1830 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 123 | 123 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The inexperienced pilot, who was flying his float-equipped Cessna on a pleasure flight to a lake 40 miles from his point of departure, made his approach into the mouth of a small bay. As the aircraft touched down, the right float struck a submerged object causing the aircraft to suddenly swerve right. The pilot reported that as he was correcting the swerve, an accidental power application produced a violent left turn which caused the aircraft to head directly for the left shore. The floats and struts of the aircraft hit tree stumps, sticking two to three feet above the water, which reduced the forward speed and prevented the aircraft from overrunning the shore.

The pilot selected an area for landing that was obstructed by a submerged object. The accidental power application combined with the loss of directional control on touchdown brought the aircraft into contact with the tree stumps. Although the tree stumps damaged the floats and struts, they did keep the aircraft from striking the shoreline and causing additional damage.

.../2

DATE: 09/5/85

FINDINGS:

Cause Related:

1. The pilot selected an area unsuitable for landing.
2. The pilot did not maintain directional control of the aircraft after the initial touchdown.
3. The pilot did not see the submerged obstruction on landing.

Other:

-- Nil --

DATE: 09/05/85

CESSNA A-185-F N1624H
WESTMEATH, NANGOR BEACH, ONTARIO
22 JUNE 1984

REPORT NUMBER: 84-040904 (Accident)
LOCAL TIME: 1805 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private USA

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,200 | 251 |
| LAST 90 DAYS | 53 | 53 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the landing in light cross-wind conditions, the float-equipped aircraft swerved to the right and nosed over. Both the pilot and passenger escaped without difficulty through the right door.

The pilot reported that the weather was good and estimated that the surface wind during landing was from the right at five to eight knots. After the accident, witnesses told the pilot that there had been dust devils prior to the aircraft's arrival, indicating that the wind conditions were variable.

The evidence suggests that because of the variable winds the aircraft touched down on the right float while drifting. The right float dug in causing the aircraft to swerve to the right and nose over.

FINDINGS:

Cause Related:

1. Because of the variable wind conditions, the right float touched down while the aircraft was drifting.
2. The right float dug in causing the aircraft to swerve to the right and nose over.

Other:

- Nil -

22/04/86

CESSNA 185A, CF-NVZ
NIPIGON, ONTARIO, 7 MI N
23 JUNE 1984

REPORT NUMBER: 84-C40038
LOCAL TIME: 1456 EDT
OPERATION: Private recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 145 | 27 |
| LAST 90 DAYS | 45 | 18 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

On a VFR flight, returning from a fishing trip low cloud and fog were encountered. Climbing to avoid higher ground the aircraft entered cloud and ground reference was lost. The aircraft was descended several times in an attempt to regain visual contact. Eventually a small lake was sighted and chosen as a landing site. On approach, it was realized that the lake was too small for a safe landing. During the attempted overshoot the aircraft floats contacted the trees and the aircraft impacted the ground. The occupants escaped serious injury and prepared themselves for a night in the bush by building a shelter. Workers in the area heard the crash and located the survivors.

A weather briefing had been received prior to departure for the trip. The weather on the outbound leg was good. Before departing for the return trip, it was determined from an overflying aircraft that the weather at the destination was above VFR minimums. This influenced the decision to continue the flight into what was thought to be only a localized weather condition.

.../2

DATE: 09/05/85

FINDINGS:

Cause Related:

1. The flight was conducted into deteriorating weather conditions.

2. Because visual flight could not be maintained a precautionary landing was attempted in a small lake.

3. It was not realized, until too late, that the lake was too small for a safe landing resulting in an unsuccessful overshoot.

Other:

- Nil -

KING FILM PRODUCTIONS INC.
CESSNA 172 N737BM
KITIMIAGAMAK LAKE, ONTARIO
23 JUNE 1984

REPORT NUMBER: 84-C40908 (Accident)
LOCAL TIME: 1320 CDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private (USA)

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 675 | 130 |
| LAST 90 DAYS | 40 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The pilot and three passengers were proceeding to a fishing lake in a float-equipped aircraft. The wind at the landing area was variable with speeds of 15 kt gusting to 30 kt. During the into wind landing flare, with 30 degree flaps selected, the wind suddenly backed in direction from 300 degrees to 210 degrees and increased in speed. Moderate turbulence was encountered; the aircraft drifted rapidly to the right, and the airspeed dropped off. Full power was applied, and the flaps were raised, but directional control could not be maintained. At low altitude, with high trees in front of him, the pilot elected to close the throttle and mush into the trees. The aircraft crashed through the tree-tops and plummeted nose down into 5 ft of water just beyond the trees. All aboard managed to exit the aircraft.

Although there were only 12 gal of fuel on board, the investigation determined that the aircraft was near allowable gross weight at the time of the accident.

.../2

19/09/85

FINDINGS:

Cause Related:

1. The aircraft encountered turbulence which caused a loss of airspeed and directional control.

Other:

-- Nil --

19/09/85

CESSNA 185, C-FNGO
GUN ISLAND, GEORGIAN BAY, ONTARIO
30 JUNE 1984

REPORT NUMBER: 84-040031 (Accident)
LOCAL TIME: 1855 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 675 | 22 |
| LAST 90 DAYS | 22 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The float-equipped aircraft was landing on the water. On touchdown the aircraft bounced, became airborne, and then settled heavily onto the water. Both wing tips and the propeller were damaged when they struck the water.

When the aircraft bounced, power was not applied nor was a go-around initiated.

FINDINGS:

Cause Related:

1. The aircraft bounced during the landing and power was not applied during the recovery.

Other:

-- Nil --

19/09/85

TRANSPORT CANADA
DE HAVILLAND DHC-6-300, C-FCSY
PRINCE GEORGE, BRITISH COLUMBIA
1 NOVEMBER 1983

REPORT NUMBER: 83-P34039 (Incident)
LOCAL TIME: 1120 PST
OPERATION: State
DAMAGE: None
PILOT LICENCE: Airline Transport

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8300 | 800 |
| LAST 90 DAYS | 30 | 14 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

On climb-out following a missed approach in fog conditions, a computer warning flag appeared on the Captain's flight director and smoke entered the cockpit. The First Officer carried out the emergency check procedure and selected the emergency bus; the smoke dissipated. The flight continued, VFR, to an alternate airport.

A capacitor in the flight director had failed causing subsequent shorting of two diodes and a transformer. This in turn caused the transformer to overheat and produce smoke. The avionics manufacturer has initiated a procedure for replacement of this capacitor with one of higher quality at first overhaul.

During the investigation of this incident, a separate potentially hazardous situation was brought to light. The automatic direction finding (ADF) navigation system was not powered by the emergency bus, yet most instrument approach procedures are dependent upon a functioning ADF.

FINDINGS:

Cause Related:

1. Failure of a capacitor in the flight director caused shorting of two diodes and a transformer, which resulted in smoke in the cockpit.

Other:

1. While operating on emergency power, the aircraft was without a functioning ADF system.

Date: 9/05/85

tEPARTMENT OF TRANSPORT
BEECH 65-B80 C-FCGT
TRENTON AERODROME, ONTARIO
11 APRIL 1984

REPORT NUMBER: 84-040014 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1910 EST
OPERATION: State
DAMAGE: Substantial
PILOT LICENCE: Senior Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 1,260 | 441 |
| LAST 90 DAYS | 13 | 13 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After take-off, a loud bang was heard as the landing gear was raised. It was determined that the right main landing gear had not retracted and was hanging down in an unsafe position. The crew elected to continue the flight to home base, but as darkness approached, they decided to land at an en-route military aerodrome. On landing, the right main landing gear collapsed, and the aircraft ran off the right-hand side of the runway.

Laboratory examination of the right main landing gear actuator revealed that the double acme thread on the bronze nut of the actuator had failed as a result of excessive wear. The excessive wear prevented the acme screw from being mechanically actuated when the landing gear was selected by either the normal or emergency system. The double acme steel screw of the actuator may have been assembled incorrectly in the bronze nut in that the acme screw could have been rotated 180 degrees out of phase from its original position. This mismatch would create new contact patterns which would conflict with those already existing. As a result, wear would be accelerated and would allow the acme screw to rotate freely in the bronze nut. It was determined that a contracted maintenance facility assembled the screw and nut assembly during an 800-hour lubrication inspection. This facility used the gear manufacturer's overhaul instructions instead of the aircraft manufacturer's overhaul manual which contains a special note of caution regarding the double acme thread.

The following laboratory report was completed: LP 140/84 - Failure Analysis - MLG Actuator - Beech 65B80, C-FCGT.

22/04/86

FINDINGS:

Cause Related:

1. The right main landing gear failed to retract on take-off.
2. The right main landing gear collapsed during a precautionary landing, and the aircraft ran off the runway.
3. Excessive wear of the double acme thread in the main landing gear caused the actuator to fail.
4. Landing gear actuation was impossible given the failure of the actuator.

Other:

1. The double acme threads may have been mismatched during a landing gear overhaul by a contracted maintenance facility.
2. The overhaul instructions used by the maintenance facility did not contain a caution regarding the known potential problem of thread mismatch.

22/04/86

LAKELAND HELICOPTERS
BELL 206B (Helicopter) C-GXCX
HUMMINGBIRD PASS, ALBERTA
21 OCTOBER 1983

REPORT NUMBER: 83-W30062 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0930 MDT
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,300 | 2,290 |
| LAST 90 DAYS | 200 | 200 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

While transporting a group of geologists on a familiarization flight of oil drilling sites, the helicopter pilot entered a mountain cirque from the north. After encountering turbulence, the helicopter began to descend rapidly. In an unsuccessful attempt to arrest the descent, the engine torque limits were exceeded. Still descending rapidly, the pilot turned through 180 degrees to the left, then flared the helicopter over a rough clearing on the floor of the cirque. The helicopter landed hard downwind and then rolled on to its right side. The fuel tank was ruptured, and the contents leaked out on to the ground. The pilot attempted to shut the engine down using the fuel shut-off and the throttle control but was unsuccessful. The engine continued to run until the fuel supply was exhausted. The rear seat passengers, who were the first to exit the helicopter, used the left rear door. The rear door, which is hinged at the forward edge, swung forward and rested on the front door, thus preventing the door from being opened from the inside. A rear seat passenger noticed the problem, returned to the helicopter and closed the rear door, allowing the front seat occupants to escape. The emergency locator transmitter (ELT), although selected to automatic, failed to activate and was turned on manually. Winds were observed to be southerly at 50 to 60 knots.

The force of the air, descending over the downwind slopes because of the strong winds, exceeded the helicopter's climb capability. Signs of adverse wind conditions were not observed until the helicopter entered the cirque and the turbulence was noted.

... /2

02/04/86

FINDINGS:

Cause Related:

1. The helicopter encountered a downdraft which exceeded its climb capability.

Other:

1. The rear door blocked the front door and prevented the front seat occupants from leaving the helicopter.
2. The engine could not be shut down with the use of either the fuel shut-off control or the throttle.

02/04/86

TERR-AIR ROTARY LTD.
SIKORSKY S58J C-GMMR
INDIAN ARM, BRITISH COLUMBIA
16 FEBRUARY 1984

REPORT NUMBER: 84-P40004
LOCAL TIME: 1420 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 14,000 | 500 |
| LAST 90 DAYS | 30 | 30 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | 1 | - | - |

SUMMARY REPORT:

The helicopter was being used to transport logs from a logging area to a beach. A log, estimated at 4000 pounds, was attached to the line and lifted in the normal manner, then the aircraft moved into forward flight. A witness reported that at about 200 feet, the engine stopped suddenly. After a short delay the load was dropped and the helicopter appeared to be under control as it followed a rugged creek bed leading to the beach. Approximately 22 seconds before impact, the first of five violent flaring manoeuvres was observed. The main rotor struck trees and the aircraft, in a nose-high attitude, hit rocky ground about 200 yards from the beach. A severe fuel-fed fire broke out immediately and the main portions of the helicopter were consumed.

The transmission and many of the engine components were melted, therefore, the cause of the power loss could not be determined. A sample taken from the fuelling source was analysed and found to meet standards. Although examination of maintenance records revealed no discrepancies, there is evidence that the pilot, who was not a licensed aircraft maintenance engineer, performed maintenance on the engine and fuel systems. The engine had flown only 29 hours since installation.

The pilot flew from the left seat when employed in this type of operation, a position which allowed him to lean over the collective control while observing the hook-up procedure. The aircraft had been modified to allow manual-load jettisoning from the left seat. The manual release could be used if the electrical release mechanism failed. Any evidence which may have explained the delayed load-release was also lost in the fire.

... /2

DATE: 20/06/85

FINDINGS:

Cause Related:

1. A complete loss of engine power occurred for undetermined reasons.
2. The power loss occurred when the aircraft was at low attitude over rugged terrain.

Other:

-- Nil --

DELTA HELICOPTERS LIMITED
HUGHES 369 HS (Helicopter) C-GXDD
FORT VERMILION, ALBERTA 64 mi NE
25 MARCH 1984

REPORT NUMBER: 84-W40018 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 0700 MST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,800 | 2,650 |
| LAST 90 DAYS | 15 | 15 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 3 |

SUMMARY REPORT:

The helicopter was taking a seismic crew from the base camp to a site 20 miles to the south. As there were low ceilings and fog patches in the area, the pilot was flying at 100 to 200 feet above ground level to remain in visual contact with the ground. While climbing to clear a low ridge, the aircraft inadvertently entered fog and the pilot attempted to turn back. During the turn, the airspeed decreased even though more power was being applied. The pilot decided to carry out a precautionary landing on a helipad located on the seismic line. However, because the engine was already at near maximum power, the turn could not be completed to the pad at a safe altitude, and the pilot landed the helicopter straight ahead in an area of small trees. The main rotor blades were damaged during the final stages of the run-on landing and when the blades drooped on shutdown.

The pilot reported that large amounts of ice were found on the main rotor blades after landing. As the air temperature was -12 degrees Celsius, the ice would have accumulated rapidily during the fog penetration and would have caused the abnormal airspeed loss and high power requirement. No faults were found in the aircraft's systems and the aircraft's weight and balance were within the prescribed limits.

28/05/86

FINDINGS:

Cause Related:

1. The pilot continued flight in weather that was not suitable for visual flight.
2. Ice accumulated on the main rotor blades when the helicopter inadvertently entered icing conditions in fog.
3. The aircraft was unable to complete a precautionary landing safely on a helipad because its performance was degraded by the accumulated ice.
4. The aircraft was damaged when it landed in an unprepared area.

Other:

- Nil -

28/05/86

ALPINE HELICOPTERS LIMITED
BELL 206B C-GALR
SPILLIMACHEEN, BRITISH COLUMBIA 22 mi E
8 APRIL 1984

REPORT NUMBER: 84-W40019 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1420 PST
OPERATION: Charter
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,200 | 1,700 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 4 |

SUMMARY REPORT:

The helicopter took off from a snow-covered mountain cirque at the 7,400-foot level. A 40-foot hover was established, and the engine power and performance were checked. As the helicopter was moved slowly forward and to the right, the right bear paw contacted the side of the cirque and rolled the helicopter on to its right side.

The reported weather at the time of the occurrence was 2 to 3 mi visibility in light snow and overcast conditions. The investigators reported that under similar conditions the following day, a mountain top 2 to 3 mi away was easily seen, yet the immediate cirque walls were virtually impossible to discern in the whiteout conditions.

The pilot chose a flight path toward a rocky outcrop that provided sufficient visual definition for a safe departure. This chosen route, however, required a higher than normal rate-of-climb to clear the wall of the cirque. In the whiteout conditions, the pilot was unable to determine his altitude above the terrain, and as a result, the helicopter struck the side of the mountain.

FINDINGS:

Cause Related:

1. The pilot took off in whiteout conditions.

2. The departure path chosen by the pilot required a higher than normal rate-of-climb to avoid the wall of the cirque.

Other:
-Nil-

10/12/85

BELL 47 G4A C-FYRZ
LA RONGE AIRPORT, SASKATCHEWAN, 1½ mi WEST
04 JUNE 1984

REPORT NUMBER: 84-C40030 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1930 CST
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 620 | 323 |
| LAST 90 DAYS | 88 | 46 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

Following maintenance on the tail-rotor assembly, the float-equipped helicopter departed from the airfield to conduct a flight test. After ten minutes of flight, the tail rotor would not respond to any antitorque pedal movement and could not be controlled. The pilot decided to execute a run-on landing at a nearby lake.

The pilot lined up into the wind and started the approach down to the lake. At about 1 ft above the water, the helicopter began to yaw again, and directional control was lost. The pilot throttled off the power and settled onto the lake. When one float suddenly lifted off the water, the main rotor struck the water surface and the tail boom was severed.

The pilot was able to shut down the engine and both he and the engineer aboard exited the machine safely.

The investigation revealed that during the installation of the new tail rotor assembly, the cross-head nut was not installed on the tail-rotor pitch change mechanism; this allowed the linkage to separate in flight. The required post-maintenance inspections were not carried out.

.../2

DATE: 19/09/85

FINDINGS:

Cause Related:

1. During the installation of a new tail rotor assembly, the tail rotor cross head nut was omitted.
2. The required post maintenance inspections were not carried out.
3. The yaw was not controllable because of the loss of tail rotor authority.

Other:

-- Nil --

19/09/85

SEALAND HELICOPTERS LTD.
BELL 206L (Helicopter) C-GMHY
ST. JOHN'S, NEWFOUNDLAND
09 APRIL 1984

REPORT NUMBER: 84-A44017 (Incident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME. Not Applicable
OPERATION: Not Applicable
DAMAGE: None
PILOT LICENCE: Not Applicable

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | - | - |
| LAST 90 DAYS | - | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During a routine maintenance inspection of the aircraft, a crack was discovered at the base of the spoke area on the oil cooler blower impeller. The total time since the impeller had been installed was 127 hours and it was removed and submitted for examination.

The crack was located in the rim of the hub end of the impeller, at the fillet between the rim and a spoke. It extended in from the fillet to the leading edge of the impeller blades and was characteristic of a high-cycle, low-stress mode of fatigue. The fatigue appeared to have a single initiation site at the rear edge on the inside diameter of the rim at one of the spoke fillets. The exact cause for the initiation of the fatigue crack was not determined. However, it was established that a similar new impeller used for comparative analysis had a defect related to the manufacturing process of the impeller hub. It was also discovered that cracked impellers have been a recurring problem on this type of aircraft. Since the occurrence, Transport Canada has been advised of the probable cause and implications of the oil cooler fan failure and has issued a Service Difficulty Alert to all operators. The manufacturer has also developed a new replacement fan.

The following laboratory report was completed: LP 157/84-Oil Cooler Blower Impeller Cracking.

.../2

26/06/86

FINDINGS:

Cause Related:

1. The impeller was cracking in a high-cycle, low-stress mode of fatigue.
2. The exact cause for the initiation of the fatigue crack was not determined.

Other:

1. Cracked oil cooler blower impellers have been a recurring problem on this type of aircraft.
2. Since the occurrence, Transport Canada has been advised of the probable cause and implication of the oil cooler blower failure and has issued a Service Difficulty Alert to all operators.
3. Since the occurrence, the manufacturer has developed a new replacement blower impeller.

26/06/86

CANADIAN COAST GUARD
BELL 206A, C-GCHM
SAINT JOHN, NEW BRUNSWICK
29 JUNE 1983

REPORT NUMBER: 83-A34005 (Incident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2000 ADT
OPERATION: State
DAMAGE: Minor
PILOT LICENCE: Not Applicable

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | UNKNOWN | UNKNOWN |
| LAST 90 DAYS | UNKNOWN | UNKNOWN |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | UNKNOWN |
| PASSENGERS | - | - | UNKNOWN |

SUMMARY REPORT:

A time expired nitrogen bottle, used for inflation of the emergency pop-out floatation gear, had been replaced while the helicopter was undergoing routine maintenance.

During the required recharging process, as the bottle was being refilled and pressure monitored, the pressure gauge blew off at the elbow connector, puncturing the skin of the fuselage. The operating pressure for the bottle is normally 3,000 p.s.i. In this instance the gauge blew off at 2,800 p.s.i.

Laboratory examination revealed that damage to the threads on the pressure gauge had prevented the gauge from being turned into the elbow by more than half a turn. It is believed that the gauge was in this position when the pressure was applied and that the blow-out occurred as the pressure was increased.

The following laboratory report was completed: LP 271/83 Emergency Floatation System.

FINDINGS:

Cause Related:

1. Damaged threads on pressure gauge prevented gauge from being properly secured.

Other:

- Nil -

19/9/85

ROYAL CANADIAN MOUNTED POLICE
BELL 206B (Helicopter) C-GDXB
UCLUELET, BRITISH COLUMBIA 46 mi NE
14 DECEMBER 1983

REPORT NUMBER: 83-P30080 (Accident)
LOCAL TIME: 1530 Pacific Daylight Time
OPERATION: State
DAMAGE: Destroyed
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 10,483 | 2,650 |
| LAST 90 DAYS | 98 | 98 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 2 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During a patrol of a remote logging area, the helicopter's main rotor blade struck the upper cable of a two-cable system which was strung across a valley and used for logging operations. The aircraft fell and struck the ground in an inverted position, killing both occupants.

The narrow, steep-sided valley at the accident site is oriented in an east and west direction and is situated in mountainous terrain. Two logging cables, which cross the valley, are anchored in rock at the 800-foot level of the south slope and strung to a support tree at the 1800-foot level of the north slope. There is another support tree and the system is anchored to a tree at the 2,950-foot level. The elevation of the floor of the valley is about 640 feet above sea level.

The main rotor blade struck the top cable at a point 302 feet above the valley floor. The helicopter passed between the cables which at that point were about 80 feet apart, and it continued for 566 feet before hitting the ground. The cable, which was about one and one-quarter inches in diameter, severed a three and one-half-foot section of the main rotor blade tip; the resulting imbalance caused a complete loss of control.

The helicopter struck the cable at high speed while flying in a westerly direction. The accident occurred about one-half hour before sunset. The low angle of the sun would have made the cable difficult to see. The cable was not marked and it did not have other visual cues that would have made it conspicuous. In addition, the dark cable blended in with the background. The helicopter's high speed, the poor light conditions, and the absence of visual cues from the unmarked cable likely prevented the pilot from seeing and avoiding the cable. Normal practice for low-level helicopter operations is to fly at slower speeds in areas where obstructions could exist.

23/10/85

A Class I NOTAM (Notice to Airmen) had been issued by Transport Canada when the cable was originally installed. The NOTAM incorrectly identified the name of the valley, its location, and the height of the cable. It was automatically cancelled about four months before the accident on the date that the cable was supposed to have been removed. A new NOTAM had not been issued at the time of the accident. The RCMP helicopter detachment office did not receive NOTAMs nor was it normal practice to determine through a flight service station or some other source whether significant NOTAMs were in effect prior to flight departure.

In accordance with the Air Regulations, Transport Canada assesses individual structures to determine whether they constitute a hazard to air navigation and thus require marking. Transport Canada, based on the information it received, decided marking of the cable was not required and did not conduct an inspection of the site. The Transport Canada "Guidelines for Assessment of Objects Affecting Navigable Airspace" (TP875E) indicate that an obstruction is considered hazardous when it exceeds 500 feet above the ground and when it is within two nautical miles of a visual flight rules (VFR) air route used extensively by small aircraft. The actual maximum height of the cable above ground was about 400 feet. The information published in the NOTAM indicated that the cable was 600 feet or more above the valley floor. The cable is located in a valley which is less than two miles from the highway between Port Alberni and Ucluelet. The highway could be used as a VFR air route.

A wire cutter was due to be installed on the aircraft during the next major inspection. However, the system does not protect against a direct rotor blade strike, and it is not designed to cut through a cable of this size.

The following laboratory reports were completed: LP 459/83 - Airframe Wreckage, LP 9/84 - Instruments, LP 12/84 - ELT Analysis, LP 18/84 - Wreckage Remnants, LP 19/84 - Warning Light Panel.

## FINDINGS:

### Cause Related:

1. The helicopter's high speed, the poor light conditions, and the absence of visual cues from the unmarked cable prevented the cable from being seen and avoided.

### Other:

1. An inspection of the site was not conducted to ascertain whether the cable should be marked.
2. The information provided in the NOTAM was incorrect.
3. The original NOTAM was cancelled without confirmation that the cable had been removed.
4. It was not normal practice for the helicopter detachment to determine whether significant NOTAMs were in effect prior to flight departure.

## SAFETY ACTIONS:

### Action Taken:

1. As a result of this occurrence the following action has been taken:

   a) Transport Canada (Air) has issued an internal directive which disallows the issuing of self-cancelling NOTAMs such as the one noted in this report. The directive also requires the issuance of NOTAMs whenever potential hazards and/or obstructions are made known to Transport Canada (Air); and

   b) The Director of Air Services of the RCMP has issued instructions to all RCMP air detachments relative to the availability and use of NOTAMs by RCMP aircrew.

2. In addition, the following related safety actions have been taken:

   a) The decision to inspect potential hazards and/or obstructions for marking purposes rests with the regional Air Navigation Services. No marking action was taken by the Department of Transport because this cable was not in an area that was extensively used as a VFR flyway, nor was it close to an airport, and the cable was less than 500 feet above ground level. The Canadian Aviation Safety Board advised the Department on 2 January 1985 that consideration be given to developing futher guidelines which would assist the regional inspectors in the evaluation of potentially hazardous aerial wires. The Department of Transport has recognized the problem of lack of guidance and a revised draft of the Standards, Obstruction Markings Manual (TP 382E) has been prepared in order to improve the clarity and objectivity of the standards;

   b) The Department has also indicated that the Aeronautical Information Publication (AIP) will be expanded to warn pilots about the hazards of obstructions in areas other than recognized VFR air routes; and

   c) Information was sent to the Safety Promotion Division of the Department of Transport on the benefits of the Wire Strike Protection System (WSPS).

### Further Action Required:

1. The Canadian Aviation Safety Board will monitor and review the following:

   a) Revised edition of the Manual for marking obstructions standards (TP 382E);

   b) Suitability and Compatability of Guidelines for Assessment of Objects Affecting Navigable Airspace (TP 875E) in regard to the revised edition of the Standards for Obstruction Markings; and

   c) Amendments to the AIP regarding avoidance of hazards to low-flying aircraft.

LAZAIR (Ultralight)
BONNYVILLE AIRPORT, ALBERTA
09 APRIL 1983

REPORT NUMBER: 83-W35002 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1655 MST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Not required by regulation at the time

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 22 | 3 |
| LAST 90 DAYS | 6 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The twin engine (Rotax) ultralight aircraft took off from an apron area in front of a hanger. The intended flight path was straight ahead between a break in the surrounding power lines. After lift-off, the aircraft yawed to the right, levelled off and then climbed again. The aircraft's wheels hit the top wires of a power line, and the aircraft fell to the ground in flames.

While taxiing, the pilot had difficulty maintaining directional control; the aircraft pulled to the right. At one point, the aircraft veered off the asphalt surface, and the nosewheel was damaged. After fixing the nosewheel, with the help of some bystanders, the pilot practised taxiing for a few more minutes and then took off. Because of the asymmetric power developed by the engines, directional control could not be maintained after take-off, and the wires to the right of the planned departure path were struck. The fire was a result of arcing power lines which ignited fuel from the damaged fuel lines.

The investigation revealed that the right engine was not capable of producing full power, because of a severely overheated front bearing. The right engine crankshaft was slightly oversized. The fuel/oil mixture used was 100 to 1 using "Eutectic" oil as recommended by the distributor. Originally, the aircraft manufacturer recommended that this type of oil and mixture be used in engines on earlier aircraft. However, mineral oil mixed at a ratio of 25 to 1 was recommended for the larger Rotax engine which was installed on this aircraft. The 100 to 1 fuel/oil mixture did not provide sufficient oil for bearing lubrication, and the bearing overheated.

.../2

02/04/86

Had the take-off been attempted from the Bonnyville Airport runway, rather than from the apron, it is likely that the pilot could have rejected the take-off on the runway or would have had sufficient distance available to climb above the power line.

FINDINGS:

Cause Related:

1. The 100 to 1 fuel/oil mixture did not provide sufficient oil for bearing lubrication resulting in overheating of the bearing.
2. The right engine was not capable of producing full power because of the overheated bearing.
3. Asymmetric power caused the aircraft to turn to the right into the power lines.
4. The take-off was attempted from the apron instead of the runway.

Other:

1. The crankshaft was slightly oversized.

02/04/86

SKYSEEKER MKI (Ultralight) C-IAXV
BOW ISLAND AIRPORT, ALBERTA
15 APRIL 1983

REPORT NUMBER: 83-W35004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1500 MST
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Not Required at the time

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3 | 3 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The student pilot was on his first solo flight in the weight-shift ultralight. His first approach during the circuit training resulted in an overshoot because the wind had shifted. On the second approach, while at about 20 feet above ground level, the aircraft slowed and stalled. The left wing dropped and the aircraft struck the ground and came to rest in an inverted position.

A pilot's perception of the aircraft's speed changes with the altitude flown. In this case, as the ultralight approached the ground for a landing, the pilot felt that the aircraft was going too fast and so he decreased the speed. As a result, the aircraft stalled.

The pilot had received ground school instruction, had spent two to four hours taxiing the aircraft and flying short, very low-altitude hops, and had received a thorough pre-solo briefing. He had no previous flying experience, nor had he received any dual, in-flight instruction. Had he been an experienced pilot or had he received dual training, it is likely that the pilot would have been more aware of the changes in visual cues. Dual training was not a prerequisite for solo flight; there were no aircraft of similar control configuration available for dual training.

Radio communication between the instructor and the student pilot was not used as the ultralight's engine noise level was too high.

.../2

FINDINGS:

Cause Related:

1. The pilot had not received any dual in-flight instruction.
2. The airspeed was allowed to decrease, and the aircraft stalled at low altitude, then struck the ground.

Other:

1. Radio communication between the instructor and the student pilot was not used as the ultralight's engine noise level was too high.

28/05/86

SKYSEEKER MK I (Ultralight) C-IAPU
BOW ISLAND AIRPORT, ALBERTA
1 MAY 1983

REPORT NUMBER: 83-W35006 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1715 MDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Not required at the time

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 6 | 6 |
| LAST 90 DAYS | 6 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The student pilot was flying his first full-circuit solo in an ultralight. During the circuit, the aircraft struck the ground in a nose-down attitude.

This type of ultralight aircraft has a single seat and employs weight shift as a means of attitude control. The student pilot's training, in addition to ground school, had consisted of a few hours of taxiing with short hops in the air, followed by low straight flights with gentle turns at an altitude of no more than 15 feet.

The pilot's control of the aircraft attitude and engine was observed to be erratic. Although the pilot's helmet was equipped with a receiver and the instructor on the ground was equipped with a transmitter, the noise from the engine prevented the student from hearing any instructions while airborne.

The planned altitude for the circuit was 200 feet. Because of the sudden transition from ground reference to horizon reference, the pilot was not able to judge his attitude or altitude. As a result, he began pumping the control bar and opening and closing the throttle. Unable to coordinate his actions, he flew the aircraft into the ground.

Both Mk I weight-shift ultralights owned by the company crashed within a short period, with solo students on their first circuits at altitude. The school now uses two-place three-axis control ultralights with dual controls.

... /2

FINDINGS:

Cause Related:

1. The student pilot's training did not adequately prepare him for the attempted operation.

2. The student pilot did not maintain control of the aircraft.

3. The method used for relaying instructions to the solo student was not adequate.

Other:

-- Nil --

02/04/86

BUTTERWICK HOLDINGS LIMITED
SKYSEEKER MK III (Ultralight) C-IFEX
DELTA AIR PARK, BRITISH COLUMBIA 1/2 mi N
29 MAY 1983

REPORT NUMBER: 83-P35004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0830 PDT
OPERATION: Specialty Flying Training
DAMAGE: Substantial
PILOT LICENCE: Student

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2 | 2 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was on a solo training flight and had just completed his first full circuit successfully. During the second circuit, while in a left turn, the drive shaft pulley broke off the propeller drive shaft and struck the pilot's helmet. The pilot shut down the engine and made an emergency landing in a field. On landing, the pilot's foot was injured.

The investigation revealed that the propeller drive shaft failed at the drive gear end. A misalignment of the drive belt resulted in abnormal loading on the shaft. Fatigue cracks were generated and ultimately led to the failure.

The following laboratory report was completed: LP 206/83 - Propeller Shaft Failure.

FINDINGS:

Cause Related:

1. Fatigue cracks were generated as a result of a misaligned drive belt.

2. The propeller drive shaft failed at the drive gear end causing the drive shaft pulley to break away.

Other:

-- Nil --

CONDITIONAL DRAFT: 1
DATE: 08/09/85
HQ ANALYST: H26

QUICKSILVER MX (Ultralight) C-IATR
DELTA AIR PARK, BRITISH COLUMBIA, 1 mi S
29 MAY 1983

REPORT NUMBER: 83-P35005 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1300 PDT
OPERATION: Private Recreational
DAMAGE: Minor
PILOT LICENCE: Unknown

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 20 | 20 |
| LAST 90 DAYS | Unknown | Unknown |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot departed from a local ultralight club airstrip for a flight over Mud Bay and the beach area nearby. While maintaining an altitude of 700 ft, the engine (Rotax-503) began to run rough. The pilot attempted to return to the airfield rather than land on the crowded beach; however, the aircraft lost altitude rapidly. As the tide was out, the pilot carried out a forced landing on a muddy area, and the right wing broke.

Investigation revealed that too much oil had been added to the fuel/oil mixture and this excess caused the spark plugs to foul.

FINDINGS:

Cause Related:

1. An excessive amount of oil was added to the fuel/oil mixture.

2. The spark plugs became fouled.

3. The aircraft experienced a loss of engine power.

Other:

-- Nil --

CONDITIONAL DRAFT: 1
DATE: 24/04/85
HQ ANALYST: H26

VISION 20 (Ultralight) Registration not required at the time
JONQUIÈRE, QUEBEC
4 JUNE 1983

REPORT NUMBER: 83-Q35007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1530 EDT
OPERATION: Private Training
DAMAGE: Destroyed
PILOT LICENCE: Not required at the time of occurrence

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | - | - |
| LAST 90 DAYS | - | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot, without any previous flying experience, attempted to take off from a parking lot in gusty cross-wind conditions. Shortly after take-off, the right wing hit a 100-foot light pole and the aircraft struck the ground. On impact, the pilot suffered a broken leg.

The pilot had taken ground school but had never had any dual-instruction time. The pilot had set for himself the goal of flying solo before his fiftieth birthday, and the accident took place three weeks before his birthday. In these gusty cross-wind conditions, an experienced pilot would have had difficulty controlling the aircraft. As well, light poles in the parking lot represented hazardous obstructions at take-off.

FINDINGS:

Cause Related:

1. The pilot attempted a flight beyond his experience and ability.
2. An unsuitable area was chosen for take-off.
3. The pilot did not have any dual-training time nor is it required by regulation.

Other:

- Nil -

06/08/86

DELTA SAILPLANE NOMAD (Ultralight) C-IBER
ALBERTA BEACH, ALBERTA 2 mi W
05 JULY 1983

REPORT NUMBER: 83-W35012 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 2100 MDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 500 | 5 |
| LAST 90 DAYS | 10 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Following take-off, a climb speed of about 30 mph was established. At about 100 feet above ground level, the left wing dropped, and the ultralight aircraft entered a turn to the left. Full right aileron was used but the turn continued. While in the turn, the aircraft's nose dropped, and the pilot brought the nose up with elevator control, but the nose dropped again. The aircraft struck the ground in a left-wing-low attitude.

The stall speed of this aircraft is 27 mph. The pilot, who had never flown this type of ultralight, chose to use a climb speed used for the type he had flown before. Further, he did not obtain performance data prior to the flight. As a result, the climb speed flown was only slightly above the stall speed.

FINDINGS:

Cause Related:

1. The aircraft performance data was not determined prior to flight.

2. The climb speed chosen was too low, and the aircraft stalled.

Other:

- Nil -

21/11/85

LAZAIR (Ultralight) C-IBIX
SAULT STE. MARIE, ONTARIO 2 mi E
9 JULY 1983

REPORT NUMBER: 83-035007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1130 EDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 607 | 137 |
| LAST 90 DAYS | 0 | 0 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

While conducting high speed taxi tests, the ultralight aircraft lifted off the water. When the pilot reduced the power, the nose of the ultralight pitched up unexpectedly. Although full power was applied and the control column was pushed forward, the aircraft maintained its nose-up attitude. Suddenly, the ultralight pitched down and struck the water.

The investigation determined that a quantity of water had leaked into the floats. Internal baffles, which would have prevented movement of the water inside the float, had not been used in the float design. The acceleration of the aircraft and the subsequent movement of the water to the back of the floats caused a rearward shift in the aircraft's center of gravity which resulted in a nose-high attitude. As the control column was moved forward to level the aircraft, the water flowed to the front of the floats and created an extreme forward center of gravity. Because of the rapidly changing center of gravity, it was impossible to control the aircraft. Prior to taxiing, the pilot could not visually check the floats for water as there were no inspection panels provided.

.../2

16/10/85

FINDINGS:

Cause Related:

1. The pilot was unaware that a quantity of water had leaked into the floats.

2. Internal baffles, which would have prevented the movement of the water and the corresponding shifts in the aircraft's center of gravity, were not incorporated in the float design.

3. Because of the rapidly changing center of gravity, it was not possible to control the aircraft.

4. The float design did not incorporate inspection panels that would have allowed the pilot to detect the water.

Other:

-- Nil --

SCORPION 133
LAC BECANCOUR, QUEBEC
4 AUGUST 1983

REPORT NUMBER: 83-Q30054 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1940 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 171 | 76 |
| LAST 90 DAYS | 21 | 21 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | 1 | - | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot of a purchaser-built helicopter departed on a local flight. Shortly after take-off, he was observed flying over the shoreline of a lake at about 200 ft above ground level (agl). As the pilot started a left turn, witnesses heard a loud noise and saw a trail of black smoke coming from the engine compartment. The helicopter descended rapidly in a 180 degree turn and struck the water in a slight nose-down attitude. The helicopter sank in about 10 ft of water.

The builder/pilot of the helicopter had bought the kit from a company in Phoenix, Arizona. This company also provided flight training. The pilot had completed 19 hours of training at this facility and was restricted to hover manoeuvres in ground effect and transitional flights at a maximum altitude of 35 ft agl. As he was not proficient in autorotations, he was not authorized for flights above 35 ft agl. These authorizations and/or restrictions are applicable for flights in the United States only. Air Navigation Order, Series II, No. 3, which sets out the conditions under which flight permits are issued, does not provide for the issuance of a flight permit to a purchaser-built helicopter. Therefore, this helicopter was being operated without a flight permit and a certificate of registration.

The helicopter had lost all rotor rpm at impact. The technical inspection revealed that the lower engine support bracket was bent down about ½ in and the upper continuing collar was tilted forward. This condition allowed the engine pulley to move aft and the belts to lose their tension which then caused a loss of drive to the rotor system. In addition, the decrease in belt tension allowed the engine to overspeed suddenly, creating noise, smoke and a rapid loss of rotor rpm.

.../2

19/09/85

There was no indication of any rotor rpm at impact. Therefore the lack of rotor rpm combined with the nose-down attitude confirmed that an autorotation was not initiated during the descent.

Prior to the accident the skid landing gear had been bent in a heavy landing. It is very probable that the lower engine support bracket was bent down at the same time.

## FINDINGS:

### Cause Related

1. The movement of the engine caused engine/transmission drive belt deterioration, which in turn, resulted in loss of rotor rpm.
2. The pilot/builder did not initiate an autorotation.

### Other

1. As privately built helicopters are not allowed in Canada, this aircraft was being operated without a flight permit and a cerfiticate of registration.

19/09/85

SUNBURST II (Ultralight) Not Registered
GRANBY, QUEBEC
21 AUGUST 1983

REPORT NUMBER: 83-Q35010 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1700 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 515 | 50 |
| LAST 90 DAYS | 80 | 50 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The two-seater ultralight aircraft was climbing out after take-off, when the two-stroke engine (Cuyuna 43 HP) lost power. The pilot carried out a forced landing straight ahead, and the aircraft touched down on rough ground. The ultralight's front end was damaged and the main frame was twisted.

The cause of the engine power loss could not be determined.

FINDINGS:

Cause Related:

1. After take-off, the engine lost power for undetermined reasons.

2. An emergency landing had to be carried out on rough terrain.

Other:

- Nil -

06/08/86

STITS SKY COUPE, C-GAXM
POINTE-AU-PIC, QUEBEC
5 SEPTEMBER 1983

REPORT NUMBER: 83-Q30061 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 0600 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 256 | 152 |
| LAST 90 DAYS | 32 | 32 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During the take-off run, the float-equipped aircraft bounced off two-foot swells and became airborne prematurely. The aircraft's speed was too low to maintain flight and the aircraft dropped on to the water. The floats were damaged on contact.

When the take-off was attempted, the swells were too high for a safe operation.

## FINDINGS:

### Cause Related:

1. The pilot attempted to take-off in two-foot-high swells.

2. When the aircraft became prematurely airborne there was not enough speed to sustain flight.

### Other:

- Nil -

19/09/85

LAZAIR MK II (Ultralight) C-ICAT
SURREY, BRITISH COLUMBIA
6 SEPTEMBER 1983

REPORT NUMBER: 83-P35013 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1500 PDT
OPERATION: Private Training
DAMAGE: Destroyed
PILOT LICENCE: Not required at the time

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 8 | 5 |
| LAST 90 DAYS | 8 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During the initial climb-out at about 100 feet above ground level, the aircraft banked to the right at an increasing rate and struck the ground in a wing-low, nose-down attitude.

The student pilot was on his first solo flight and in radio contact with an instructor on the ground. The instructor told the pilot to lower the left wing by moving the control stick to the left. Although these instructions were received by the pilot, he did not take corrective action, and as a result, control of the aircraft was lost.

FINDINGS:

Cause Related:

1. Positive control of the aircraft was not maintained.

Other:

-- Nil --

19/09/85

SMITH MINI PLANE, C-FYSG
BARRIE AIRPORT, ONTARIO
11 SEPTEMBER 1983

REPORT NUMBER: 83-030057
LOCAL TIME: 1550 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 713 | 370 |
| LAST 90 DAYS | 7 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The amateur-built aircraft was making a daylight approach to a sod runway 1800 feet long and 125 feet wide. The runway was marked by metal cones spaced 200 feet apart along each side of the runway. One runway light was mounted atop each cone. Electrical power is supplied by a buried cable which was attached, without break-away connectors, to a junction box under each cone. The aircraft touched down left of the runway centreline in a 16 knot, 20-degree cross-wind from the right. It drifted left, struck two runway marker cones and pulled electrical wiring from the ground. During the overshoot the aircraft flew two hundred feet beyond the end of the runway, turned 90 degrees to the right, dropped a wing and plunged almost vertically to the ground. On impact the pilot's head, which was protected by a motorcycle-type helmet, struck the right side of the instrument panel and fuselage.

The overshoot was unsuccessful because the aircraft was hindered by an entangled electrical cable. There was pre-impact failure of a weld in the tail wheel steering linkage which contributed to the loss of directional control on the ground.

.../2

DATE: 9 April 1985

FINDINGS:

Cause Related

1) Directional control on the ground was lost due to both the cross-wind and the failure of the tail wheel steering linkage.

2) The tail wheel linkage failed at a weld point.

3) The overshoot was unsuccessful because the aircraft was hindered by an entangled electrical cable.

4) The runway lighting electrical wiring system did not have break-away connectors.

Other

1) The wearing of a helmet limited the severity of the pilot's head injuries.

AMATEUR-BUILT (Ultralight) C-IAFH
MOUNT ELGIN, ONTARIO 1 mi SE
25 SEPTEMBER 1983

REPORT NUMBER: 83-035014 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 0945 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: None

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 100 | 85 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

After taking off for a short flight to a nearby private strip, the pilot circled the departure airport to gain altitude and to ensure that everything was working properly. As the aircraft climbed at low airspeed to a height of about 500 feet, the left engine sputtered twice and then stopped. Directional control was lost and the aircraft began to spin or spiral to the left. The pilot shut the right engine down and tried to recover with full application of opposite aileron but to no avail. In a desperate attempt to regain control, he climbed out on to the right wing strut but was still unsuccessful. The aircraft struck the surface in a left-wing-low, nose-down attitude.

An initial on-the-scene investigation established that the left engine compression was good, that the spark plug was clean and well gapped, and that the magneto was capable of producing a spark. The fuel line at the carburettor attachment did not contain any fuel. The left engine was removed for closer examination; however, the engine was stolen before the examination could be carried out.

After the engine failure, the aircraft's speed was allowed to decrease to the point where control could not be maintained.

The aircraft was copied by the owner/pilot from a commercial production model using similar materials and construction. There is no certainty that the flight characteristics or performance would be the same as a factory model.

.../2

26/06/86

FINDINGS:

Cause Related:

1. The engine stopped for undetermined reasons.
2. The airspeed was allowed to drop and the aircraft entered into a spin or spiral to the left from which the pilot could not recover.

Other:

1. The flight characteristics and performance of this copied version of the commercial construction are unknown.

26/06/86

COOT-A (Amateur-built) C-GLOO
SHERBROOKE AIRPORT, QUEBEC 2 mi E
14 NOVEMBER 1983

REPORT NUMBER: 83-Q30077 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1100 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 400 | 89 |
| LAST 90 DAYS | 20 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The amateur-built aircraft took off with a full load of fuel on board. Two hours and 30 minutes into the flight, and 2 miles from the destination airport, the aircraft's engine stopped. The pilot carried out a forced landing on a field. During the landing roll, the nose gear and the left main gear were damaged when the aircraft contacted the uneven terrain.

An examination of the fuel system revealed that there was no usable fuel available and that the carburettor was set at an excessively rich mixture. The pilot reported that he was two hours into the flight before he noticed the high rate of fuel consumption. He leaned the mixture, but by that time, there was not enough fuel to complete the flight.

FINDINGS:

Cause Related:

1. The carburettor was set at an excessively rich mixture.
2. Fuel consumption was not monitored.
3. The loss of power was due to fuel exhaustion.
4. The site selected for the emergency landing was rough.

Other:

- Nil -

19/11/85

LAZAIR (Ultralight) C-IADR
MONTNEY, BRITISH COLUMBIA
06 JANUARY 1984

REPORT NUMBER: 84-W45001 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1600 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Not Applicable

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 140 | 130 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft was an ultralight on skis. Prior to take-off, the pilot had to remove a thick coat of frost which had formed on the wings. Following lift-off, the aircraft's performance was sluggish, and the pilot decided to reduce the power and land straight ahead. He then realized that the aircraft was going to hit some parked farm machinery, so he applied power but could not avoid the machinery.

The freezing temperatures and high relative humidity were suitable for the formation of frost. Although the pilot had removed the frost, either a residue of old frost or a rapid formation of new frost prior to take-off interfered with the smooth airflow over the wing, and flight could not be sustained.

FINDINGS:

Cause Related:

1. The aircraft performance was adversely affected by the formation of frost on the wings.

Other:

-- Nil --

19/09/85

AMERICAN AEROLIGHTS (Ultralight) C-IFLZ
YARROW, BRITISH COLUMBIA
03 FEBRUARY 1984

REPORT NUMBER: 84-P45002 (Accident)
INFORMATION SOURCE:
LOCAL TIME: 1600 PST
OPERATION: Private Company Business
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 90 | 85 |
| LAST 90 DAYS | 4 | 4 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

While flying at 400 feet above ground level, a sudden jolt was felt, and the ultralight entered a steep descending turn from which the pilot was unable to recover. The emergency parachute was deployed and the aircraft, with its two occupants, descended safely to the ground.

An examination determined that the wing trailing edge support (keel pocket) had failed in flight. This condition allowed the wing to move out of position, thus producing uncontrollable flight characteristics.

The keel pocket is sewn into the wing sail and is the only support for the trailing edge of the wing. Investigators determined that the stitching in the keel pocket was of insufficient area to provide adequate strength under normal flight loads. Poor stitch quality and the lack of support material between fabric layers also contributed to the in-flight separation.

The design and production of ultralight aircraft in Canada is unregulated.

As a result of this investigation the manufacturer has issued a service bulletin requiring reinforcement of the keel pocket.

.../2

19/09/85

FINDINGS:

Cause Related:

1. The wing trailing edge support failed in flight.

2. The wing trailing edge support construction was inadequate to withstand repeated normal flight loads.

Other:

1. There are no safety standards applicable to the design and production of ultralights in Canada.

2. The availability and use of an emergency parachute prevented a more serious injury.

19/09/85

SKYSEEKER MK III (Ultralight) C-ICNR
DRUMMONDVILLE AIRPORT, QUEBEC
16 FEBRUARY 1984

REPORT NUMBER: 84-Q45001 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1615 EST
OPERATION: Private Training
DAMAGE: Destroyed
PILOT LICENCE: Student Permit

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2 | 2 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

## SUMMARY REPORT:

The student pilot was conducting short hops along the snow-covered runway in an ultralight aircraft. This exercise was to be executed at a maximum height of six feet; the pilot was then to throttle back and land again. However, the aircraft went higher than expected, and the pilot pushed the stick forward to avoid stalling. The aircraft hit the ground in a 45-degree nose-down attitude and nosed over.

Because of his lack of experience, the pilot exaggerated the nose-down movement when he attempted to avoid stalling. In addition, his depth perception was affected by the snow on the runway; as a result, he did not flare in time.

The pilot did not have any dual-training time, nor is it required by regulation.

## FINDINGS:

### Cause Related:

1. The pilot waited too long before throttling back.
2. The pilot, while attempting to avoid a stall, exaggerated the nose-down movement.
3. Snow on the runway affected the pilot's depth perception and as a result, the flare was attempted too late.
4. The pilot did not have any dual-training time, nor is it required by regulation.

### Other:

- Nil -

06/08/86

MIRANDA AMFS14 (Amateur-built) CF-ZTB
STANLEY AIRPORT, NOVA SCOTIA
18 FEBRUARY 1984

REPORT NUMBER: 84-A40001 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1605 AST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 155 | 8 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

During a cross-wind landing, the aircraft touched down while drifting to the right, which caused the right main landing gear to collapse inboard. The aircraft bounced and during the second touchdown, the right main gear folded underneath. The aircraft stopped rapidly and came to rest on the left main gear and right wing tip.

Laboratory examination determined that the landing gear shock strut failed as a result of the excessive side load which was exerted on the landing gear during the landing. The design of the shock strut was adequate for normal landings but had not been designed to withstand the side load that was imposed. The pilot did not compensate sufficiently for the drifting effect at touchdown.

FINDINGS:

Cause Related:

1. The pilot did not eliminate the drift prior to touchdown.
2. The aircraft touched down while drifting to the right.
3. The shock strut failed as result of an excessive side load and the right main landing gear folded inboard.

Other:

-- Nil --

19/10/85

LAZAIR (Ultralight) C-ICGN
BEACHBURG, ONTARIO 2 mi N
24 FEBRUARY 1984

REPORT NUMBER: 84-045001 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1450 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 326 | 22 |
| LAST 90 DAYS | 2 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

## SUMMARY REPORT:

The pilot, who was on a local sightseeing flight, had conducted three successful landings on various snow-covered fields. When he reduced power to descend for the fourth landing, the left engine (Rotax 185cc) stopped. Unable to maintain altitude with the right engine, the pilot prepared for a forced landing. To reach the landing area, the aircraft had to pass over a telephone cable and under hydro wires. The upswept wing tips struck the hydro wires, and the aircraft fell to the ground on its nose.

The pilot later reported that a local small engine shop had checked the engine after the accident and had informed him that the low speed jet on the left engine was at too lean a setting.

## FINDINGS:

### Cause Related:

1. The low speed jet on the left engine was at too lean a setting, resulting in engine stoppage.

2. The aircraft struck hydro wires during the forced landing and fell to the ground on its nose.

### Other:

- Nil -

06/08/86

DER JAGER (Homebuilt) C-GXVH
WETASKIWIN, ALBERTA
04 APRIL 1984

REPORT NUMBER: 84-W40020 (Accident)
LOCAL TIME: 1830 MST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 3,010 | 6 |
| LAST 90 DAYS | 25 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

During the landing roll, the aircraft swerved to the left. The main gear assembly on the right failed, and the aircraft skidded off the runway and came to rest on its right wing.

The pilot reported that the left brake had been spongy. On this landing, the brake pedal bottomed out, and the left brake seized. Examination of the wheel assembly showed that the brake disc had been installed incorrectly. There was evidence of extreme wear on both the disc and the mating wheel half. This brake component wear allowed the brake disc to be incorrectly installed. When the brake seized, directional control was lost and the right main gear failed because of a bending overload.

The homebuilt aircraft had been purchased recently, and it was not possible to determine the maintenance history of the aircraft. Technical records are not required by regulation to be kept on homebuilt aircraft, nor is further inspection required after the flight permit has been obtained.

.../2

19/09/85

FINDINGS:

Cause related:

1. The brake disc had been incorrectly installed.
2. Excessive wear on the disc and mating wheel half allowed the brake disc to be incorrectly installed.
3. Directional control was lost because the left brake seized.

Other:

1. The maintenance history of the aircraft could not be determined.

19/09/85

LAZAIR (Ultralight) C-1BXS
SAULT STE. MARIE, ONTARIO
7 APRIL 1984

REPORT NUMBER: 84-045003 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1500 EST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 606 | 20 |
| LAST 90 DAYS | 2 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

## SUMMARY REPORT:

The wind flag located at the far end of the runway was not visible to the pilot during the take-off. Shortly after becoming airborne, the aircraft crashed into trees beside the private runway. The wing and left ruddervator were damaged.

Immediately after take-off, the pilot realized that the wind had switched direction and increased in velocity, and he was unable to maintain directional control of the aircraft. A 10-knot cross-wind exceeded the safe operating limit of the ultralight.

## FINDINGS:

### Cause Related:

1. The pilot took off in wind which exceeded the safe operating limit of the aircraft.
2. Directional control could not be maintained after take-off.

### Other

- Nil -

03/10/85

SKYSEEKER MKII (Ultralight) C-IEJC
KIRKLAND LAKE, ONTARIO
11 APRIL 1984

REPORT NUMBER: 84-045004 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1348 EST
OPERATION: Private Training
DAMAGE: Destroyed
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 285 | 55 |
| LAST 90 DAYS | 29 | 24 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The ultralight aircraft was on the downwind leg of the circuit when the engine, (ROTAX 503), stopped. An attempt was made to glide to the frozen lake which was being used as a runway. Before it could reach the landing area, however, the ultralight collided with the trees bordering the lake and was destroyed.

The investigation determined that the fuel pump had been clogged by fuel contaminated with plastic shavings from the fuel tank interior. The contamination prevented the pump from delivering sufficient fuel for engine operation.

FINDINGS:

Cause Related:

1. The fuel pump, which was contaminated by plastic shavings, was unable to deliver sufficient fuel for engine operation.

2. The engine's loss of power was due to fuel starvation.

3. During the forced landing, the ultralight hit trees bordering the landing area.

Other:

- Nil -

19/09/85

SKY RANGER (Ultralight) C-IBXV
LETHBRIDGE, ALBERTA
14 APRIL 1984

REPORT NUMBER: 84-W45004 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1850 MST
OPERATION: Private
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | | ON TYPE | |
|---|---|---|---|---|
| | LEFT SEAT | RIGHT SEAT | LEFT SEAT | RIGHT SEAT |
| TOTAL | 4,392 | 2,500 | 82 | 0.5 |
| LAST 90 DAYS | 40 | 40 | 25 | 0.5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The owner and an instructor from a flying club were testing the suitability of the two place, dual control ultralight as a training aircraft. With the club instructor in the right seat and at the controls and the owner in the left seat, they took off intending to fly several circuits. During the first circuit at 200 ft above ground level, the engine (Rotax 503) lost power. A forced landing was carried out straight ahead on a farm field. The aircraft landed in a nose-down attitude, the nose gear collapsed, and the aircraft flipped over.

Although the quantity of fuel on board the aircraft could not be determined, it was reportedly adequate for the flight. When the engine was examined at the accident site, there was only about a ¼ in of fuel in the carburettor float bowl. This would normally indicate that the engine stopped because of fuel starvation. Foreign material, which appeared to be paint fragments, was found in the fuel, but it could not be determined if this substance caused the fuel interruption. The engine was tested later and was found to be capable of normal operation. The reason for the fuel flow interruption to the engine could not be determined.

The area used for the emergency landing was in the middle of a cultivated field. The landing was made with a slight tail wind in line with the low furrows. The club instructor was inexperienced on type and did not raise the nose sufficiently before landing; as a result the nosewheel dug in and collapsed. The owner, who was a qualified instructor on ultralight aircraft, did not attempt to take control of the aircraft after the engine lost power.

... /2

10/12/85

FINDINGS:

Cause Related:

1. The engine stopped because of fuel starvation; the reason for the fuel flow interruption could not be determined.
2. The owner did not take control of the aircraft after the engine lost power.
3. The pilot at the controls had limited ultralight experience.
4. The pilot at the contols did not raise the aircraft nose sufficiently before landing.

Other:

-- Nil --

10/12/85

EAA BIPLANE (Homebuilt), CF-TQN
THOMPSON, MANITOBA
8 MAY 1984

REPORT NUMBER: 84-C40023 (Accident)
LOCAL TIME: 1358 CDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 600 | 8 |
| LAST 90 DAYS | 7 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot was practising touch and go landings. During the fourth circuit, while on final approach the pilot's attention was distracted by smoke inside the cockpit. As he was trying to deal with the smoke, the aircraft landed hard on the runway surface. The right landing gear failed and the propeller struck the ground as the aircraft slid to a stop on the asphalt.

The smoke was caused by a short circuit between wires which were taped together.

FINDINGS:

Cause Related:

1. A short circuit between wires which were taped together caused smoke in the cockpit.

2. The pilot distracted by the fire allowed the aircraft to touchdown with an excessive rate of descent.

Other:

- Nil -

DATE: 09/05/85

KINGFISHER, C-GDEC
DRYDEN, ONTARIO
13 MAY 1984

REPORT NUMBER: 84-C40024
LOCAL TIME: 1850 CDT
OPERATION: Ferry Flight
DAMAGE: Substantial
PILOT LICENCE: USA Commercial

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 525 | 6 |
| LAST 90 DAYS | 19 | 6 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:
The recently purchased aircraft was being ferried to the USA. During the initial climb the engine began running rough and lost power. The pilot attempted to return to the departure airport but the aircraft was unable to reach the runway. A forced landing was made on a narrow gravel road one-quarter mile from the airport. When the left sponson contacted the ground the aircraft veered from the road and was damaged.

A spark plug was found to be loose. This allowed exhaust gas to blow by and damage the plug. The spark plug was shorting out against the cylinder head which, along with the loss of compression, resulted in a loss of engine power.

FINDINGS:

Cause Related

1. A loose spark plug was shorting out because of exhaust gas damage, which caused rough running and resulted in a loss of power.

2. The aircraft was damaged after it veered from a road, following sponson contact with the ground.

Other

-- Nil --

DATE: 9 April 1985

McDUFF HOMEBUILT
ST. CUTHBERT, QUEBEC
18 MAY 1984

REPORT NUMBER: 84-Q40023 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1830 EDT
OPERATION: Private Testing
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 700 | 3 |
| LAST 90 DAYS | 3 | 3 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot had limited flight time on the homebuilt aircraft that he had designed and constructed. A short local flight was planned and following engine run-up, take-off was made from a small field. After 10 minutes of flight the engine (Volkswagen) stopped. Carburettor heat was selected and the engine restarted but only momentarily. A forced landing was made to a field, however, on touchdown with low airspeed and a rapid rate of descent the gear collapsed resulting in substantial damage.

The aircraft did not have a valid flight permit. Without a set of tables to help determine performance data, aircraft performance could not be evaluated following the accident. The cause of the engine stoppage also remains undetermined.

FINDINGS

Cause Related

1. The engine stopped for an undetermined reason.

2. The aircraft landed with a high rate of descent.

3. The airspeed on touchdown was low.

Other

1. The homebuilt did not have a valid flight permit.

19/9/85

TIERRA II (Ultralight) Unregistered
IDDESLEIGH, ALBERTA 6 mi S
19 MAY 1984

REPORT NUMBER: 84-W45005 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1845 MDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 65 | 20 |
| LAST 90 DAYS | 30 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | 1 | - |
| PASSENGERS | - | 1 | - |

SUMMARY REPORT:

The unregistered ultralight aircraft was being flown home after an inspection trip around the owner's property. While cruising at about 100 feet above the ground, the pilot lost pitch control through the elevator. By applying full power, the pilot was able to stabilize the aircraft in a shallow descent. While flying over an open farm field, the pilot attempted to land. At about 10 feet above the ground, he reduced power for a normal round-out. The aircraft, without any pitch control, pitched forward and dove into the ground. Both the pilot and the passenger were not wearing helmets and sustained head and other injuries.

The technical analysis revealed that the elevator control torque tube had failed in a low-cycle, high-stress fatigue mode of progressive cracking at the toe of the tube-to-arm weld. It was further concluded that the thickness of the tube was inadequate to withstand normal operating loads, the design of the tube-to-arm weld joint was not optimum, and no post-weld treatment of the assembly had taken place.

Further investigation revealed that all 1984 models of this aircraft were affected by this defect. The manufacturer, when informed of the deficiency, took immediate steps to notify owners of this particular model and also to supply them with a redesigned replacement part.

At the time of the accident, Transport Canada regulations regarding ultralight aircraft stated that all ultralight aircraft were required to be registered, each occupant of an ultralight was required to wear a protective helmet, and the private ultralight pilot licence did not allow the carriage of passengers.

The following laboratory report was completed: LP 182/84 - Elevator Control Torque Tube Failure.

.../2

21/11/85

FINDINGS:

Cause Related:

1. The elevator control torque tube failed in a low-cycle, high-stress fatigue mode of progressive cracking.
2. Both the design and the manufacture of the elevator control torque tube were inadequate.

Other:

1. The ultralight aircraft was not registered.
2. A passenger was carried on the flight contrary to regulations.
3. Protective helmets were not worn.

21/11/85

PITTS SPECIAL S1C G-GEVT
WATERLOO-WELLINGTON, ONTARIO
21 MAY 1984

REPORT NUMBER: 84-040019 (Accident)
INFORMATION SOURCE: Field Investigation
LOCAL TIME: 1655 EDT
OPERATION: Private Operational
DAMAGE: Substantial
PILOT LICENCE: Private

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 142 | 24 |
| LAST 90 DAYS | 5 | 5 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The aircraft bounced on landing, and when it touched down again, the pilot lost directional control. The aircraft rolled off the runway and nosed over.

The pilot tried to recover from the bounced landing; however, the power was not increased in accordance with accepted bounce recovery technique. Therefore, when the aircraft touched down again, the speed was slow, and the rudder was ineffective in maintaining directional control. In an attempt to stop the aircraft, the brakes were applied harshly, and the aircraft nosed over on to its back.

FINDINGS:

Cause Related:

1. Power was not increased to assist in the bounce recovery.

2. The excessive use of brakes caused the aircraft to nose over.

Other:

-- Nil --

19/10/85

ONTARIO ADVENTURE FLIGHT CENTRE LIMITED
QUICKSILVER MXII (Ultralight) C-IAQX
TOTTENHAM-VOLKS FIELD, ONTARIO
27 MAY 1984

REPORT NUMBER: 84-045006 (Accident)
LOCAL TIME: 1530 EDT
OPERATION: Private Training
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | | ON TYPE | |
|---|---|---|---|---|
| | INSTRUCTOR/ | STUDENT | INSTRUCTOR/ | STUDENT |
| TOTAL | 100 | 0.5 | 7 | - |
| LAST 90 DAYS | 30 | 0.5 | 7 | - |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 2 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The instructor and student were conducting a local training flight with the instructor at the controls. At about 35 mph, as the ultralight became airborne, it began an uncontrolled turn to the right dragging the right wing tip on the ground. The right turn continued until the aircraft struck a hangar.

The aircraft was at or near the recommended maximum take-off weight. Because of the high weight, the instructor decided to start the take-off run several hundred feet before the threshold of the runway. The wind was light and almost 90 degrees from the right. Paralleling the runway to the right were a line of trees and several buildings including the hangar which was struck by the aircraft.

An examination of the ultralight did not reveal any defect which could have contributed to the loss of control. Although no wind measuring device was available and the actual wind direction and speed could not be determined accurately, the reported 90-degree cross-wind may have affected the ultralight's performance. The ultralight may also have entered an area of turbulent air caused by the obstructions on the upwind side of the runway.

A runway oriented east and west, almost directly aligned with the reported wind, was available for take-off.

.../2

18/03/86

FINDINGS:

Cause Related:

1. The pilot attempted a take-off in a right cross-wind which may have affected the ultralight's performance at or near the manufacturer's recommended maximum take-off weight.

Other:

1. A suitably oriented runway was available for the attempted take-off.

18/03/86

KASPERWING 1-80B (Ultralight), C-IAVU
ASSINIBOIA, SASKATCHEWAN
15 JUNE 1984

REPORT NUMBER: 84-C45002 (Accident)
LOCAL TIME: 2005 CST
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Commercial Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 90 | 20 |
| LAST 90 DAYS | 8 | 8 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

Take-off was initiated from a narrow grid road with banked shoulders. Due to the high ambient temperature and variable wind conditions, the roll was longer than anticipated; the ultralight had travelled about 100 ft when the right wing lifted, causing the left-hand flying wires to catch on the edge of the road. The aircraft ground-looped.

FINDINGS:

Cause Related:

1. Take-off was initiated from a confined area.

2. The wind and temperature adversely affected take-off performance.

3. Control of the aircraft was not maintained during the take-off roll.

Other:

- Nil -

DATE: 9/05/85

SKYSEEKER MKII (Ultralight) C-IFBJ
BRANTFORD, ONTARIO
22 JUNE 1984

REPORT NUMBER: 84-045007 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 0700 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 65 | 22 |
| LAST 90 DAYS | 22 | 22 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The pilot assembled his ultralight aircraft and prepared for a test flight. During take-off, forward thrust was lost at an altitude of about 8 feet above the ground. The aircraft, at low airspeed, stalled and landed heavily on the runway.

The investigation determined that the "V" belts, which drive the propeller, had not been adequately tightened during installation. As a result, the belts slipped and the forward thrust, which is required to maintain flying speed, could not be developed by the propeller. The aircraft's low altitude and airspeed did not allow the pilot to recover from the stall.

FINDINGS:

Cause Related:

1. The "V" belts, which were inadequately tightened during installation, slipped during take-off.
2. The forward thrust, required to maintain flying speed, was lost when the belts slipped.
3. The low altitude and airspeed prevented a recovery from the stall which caused the aircraft to land heavily.

Other:

-- Nil --

16/10/85

KAWARTHA SOARING CLUB INC.
BLANIK L-13 (GLIDER) C-GARR
OMEMEE, ONTARIO 1 mi NW
23 JUNE 1984

REPORT NUMBER: 84-040028 (Accident)
INFORMATION SOURCE: Correspondence Investigation
LOCAL TIME: 1230 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private, Glider

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 78 | 58 |
| LAST 90 DAYS | 4 | 2 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | 1 |

SUMMARY REPORT:

The glider was being towed aloft for a local familiarization flight. At 1,300 ft agl, the towplane lost power and started to descend. As the glider started to overtake the towplane, spoilers were deployed, and the tow was released. The spoilers were then stowed, and the glider was turned downwind in an attempt to return to the landing strip. A faster than expected sink rate prompted the pilot to turn directly to the landing strip. The towplane, with power restored, suddenly appeared on final in front of the glider. Because of the appearance of the towplane and the glider's rapid sink rate, the glider pilot decided to land in a field. The glider landed short of the selected field and struck a row of trees along a fence line.

The glider pilot, distracted by the appearance of the towplane in front of him and by the high sink rate, did not complete the prelanding check. As a result, he was unaware that the spoilers had redeployed. The high sink rate produced by the spoilers prevented the glider from reaching the intended touchdown point and resulted in the undershoot. The redeployment of the spoilers remains unexplained; however, it is possible that they may have inadvertently been deployed.

.../2

19/10/85

FINDINGS:

Cause Related:

1. The tow was released prematurely at a lower than normal altitude due to a loss of power by the towplane.

2. As the glider pilot was attempting to return to the landing strip, the tow plane suddenly appeared in front of him, so he decided to land in another field.

3. The high sink rate resulted in the glider undershooting the intended landing area.

4. The pre-landing check was not completed.

Other:

1. The redeployment of the spoilers was not recognized by the pilot as the cause of the high sink rate.

BENSON B8M, C-GOQK
MARKHAM AIRPORT, ONTARIO
26 JUNE 1984

REPORT NUMBER: 84-040029
LOCAL TIME: 1400 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Private Rotorcraft

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 97 | 94 |
| LAST 90 DAYS | 1 | 1 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The gyroplane was flown by a pilot with limited recent rotary wing experience. Following a brief test flight, on approach for landing, he decided to continue down the runway further than originally intended to permit a waiting aircraft to taxi to position. Power was applied to extend the approach with the carburettor heat left in the on position thus limiting available power. The aircraft continued its descent, touched down briefly on the runway, and then began drifting right. The landing gear struck a ditch rolling the aircraft onto its side, damaging the nose gear and rotor system.

The continued use of carburettor heat restricted available power causing the aircraft to settle momentarily onto the runway. Once in ground effect it became airborne again with right drift and limited ground clearance. Lateral movement caused the aircraft to roll over when the gear contacted the ground.

FINDINGS:

Cause Related

1. The pilot was using carburettor heat and was thereby denied the power required to extend his approach.

2. Lateral movement of the aircraft on landing caused it to roll over.

Other

- Nil -

DATE: 09/05/85

LAZAIR (Ultralight) C-IACY
STONEY LAKE, ONTARIO
29 JUNE 1984

REPORT NUMBER: 84-045009 (Accident)
LOCAL TIME: 1930 EDT
OPERATION: Private Recreational
DAMAGE: Substantial
PILOT LICENCE: Ultralight

| PILOT HOURS: | ALL TYPES | ON TYPE |
|---|---|---|
| TOTAL | 2,000 | 70 |
| LAST 90 DAYS | 20 | 20 |

| INJURIES: | FATAL | SERIOUS | MINOR/NONE |
|---|---|---|---|
| CREW | - | - | 1 |
| PASSENGERS | - | - | - |

SUMMARY REPORT:

The float-equipped ultralight took off from a sheltered bay. After climbing to about 10 feet, the aircraft nosed into the water. The wing leading edges, the propeller, the floats, and the engine were damaged.

The pilot had waited most of the day for suitable wind conditions to fly his ultralight. After take-off, stronger winds were encountered when the aircraft flew from the lee side of the bay. The wind was of sufficient strength that aircraft control was lost.

FINDINGS:

Cause Related:

1. Aircraft control was lost because winds stronger than expected were encountered when the ultralight emerged from a sheltered area.

Other:

-- Nil --

22/04/86

ANNEX 1

## REPORT BY AIRCRAFT MANUFACTURER AND TYPE

| MANUFACTURER | TYPE | REPORT NUMBER | PAGE |
|---|---|---|---|
| AIR MASS | SUNBUR | Q35010 | 221 |
| AMER AVCO | AA1A | P40022 | 147 |
| AMERICAN | EAGLE | P45002 | 230 |
| ANDERSON,EW | EA1 | C40024 | 242 |
| BEECH | 18 | O40902 | 81 |
| | | Q40007 | 13 |
| BEECH | 23 | Q40028 | 141 |
| | 35 | O40033 | 156 |
| | | P40019 | 134 |
| | 80 | O40014 | 192 |
| | 99 | Q44006 | 12 |
| BELL | 206 | A34005 | 205 |
| | | A44017 | 203 |
| | | P30080 HP | 206 |
| | | W30062 | 194 |
| | | W40019 | 200 |
| | 47 | C40030 | 201 |
| BENSEN | B8M | O40029 | 253 |
| BOEING | 737200 | O44007 | 2 |
| | 767200 | Q34012 | 25 |
| BRITTNORMAN | BN2A | A44014 | 61 |
| | | A44015 | 65 |
| CASCADE | KASPER | C45002 | 249 |
| CESSNA | 140 | P40012 | 118 |
| | 150 | Q40013 | 111 |
| | | Q40029 | 143 |
| | | Q40033 | 182 |
| | 152 | O40802 | 39 |
| | | Q40801 | 64 |
| | 170 | O40026 | 149 |
| | 172 | A40014 | 80 |
| | | C40004 | 100 |
| | | C40904 | 136 |
| | | C40908 | 188 |
| | | O40016 | 38 |
| | | O40027 | 182 |
| | | O44006 | 31 |
| | | P40021 | 144 |
| | | P40802 | 33 |
| | | Q40012 | 32 |
| | | W30052 | 92 |
| | | W40007 | 50 |
| | | W40015 | 54 |
| | 177 | C44006 | 103 |
| | | P30081 | 97 |
| | | P44008 | 146 |

| MANUFACTURER | TYPE | REPORT NUMBER | PAGE (con't) |
|---|---|---|---|
| Cessna | 180 | A40006 | 66 |
| | | A40009 | 177 |
| | | C40002 | 166 |
| | | C40015 | 170 |
| | | C44001 | 11 |
| | | O40015 | 116 |
| | | O40022 | 174 |
| | | O40901 | 179 |
| | | P34037 | 163 |
| | | Q40021 | 67 |
| | | W30036 | 157 |
| | | W40004 | 167 |
| | | W40016 | 110 |
| | | W40023 | 62 |
| | 182 | P40024 | 151 |
| | 185 | A40012 | 22 |
| | | C40019 | 17 |
| | | C40021 | 19 |
| | | C40038 | 186 |
| | | O40031 | 190 |
| | | O40904 | 185 |
| | | P30082 | 9 |
| | | P40007 | 15 |
| | | P40018 | 175 |
| | | Q30067 | 161 |
| | | W30060 | 95 |
| | | W30061 | 164 |
| | | W40009 | 102 |
| | | W40022 | 114 |
| | 188 | C44022 | 145 |
| | 190 | P40011 | 121 |
| | 206 | Q34064 | 159 |
| | 210 | A40901 | 123 |
| | | C40905 | 152 |
| | | W30066 | 98 |
| | | W30903 | 87 |
| | | W40902 | 132 |
| | 310 | Q40036 | 83 |
| | 340 | W40010 | 104 |
| | 402 | W40036 | 23 |
| | 421 | A40003 | 113 |
| CHAMPION | 7ECA | Q40010 | 52 |
| | 7GCB | A40002 | 169 |
| | | Q40026 | 140 |
| CONVAIR | CV580 | O44022 | 4 |
| | PBY-5A | C40025 | 68 |
| | | C44021 | 70 |
| COOT | AMPHIB | Q30077 | 228 |
| CZECH | L13 | O40028 | 251 |

| MANUFACTURER | TYPE | REPORT NUMBER | PAGE (con't) |
|---|---|---|---|
| DEHAVND CAN | DHC1 | Q40802 | 117 |
|  | DHC2 | A40802 | 60 |
|  |  | C40026 | 73 |
|  |  | C40029 | 20 |
|  |  | C40042 | 85 |
|  |  | P30083 | 49 |
|  |  | P30084 | 10 |
|  |  | Q30037 | 45 |
|  | DHC6 | C44008 | 57 |
|  |  | W30065 HP | 7 |
|  | DHC6-3 | P34039 | 191 |
| DELTA | NOMAD | W35012 | 216 |
| DER JAGER |  | W40020 | 235 |
| DOUGLAS | DC3 | O30045 | 46 |
| EAA BIPLANE |  | C40023 | 241 |
| EIPPER | QKSILV | O45006 | 247 |
|  |  | P35005 | 214 |
| GATES LEAR | 25B | O34074 | 1 |
| GRUMMAN | TBM | A40007 | 72 |
|  |  | A40013 | 78 |
| HELIO ACFT | H295 | A40005 | 63 |
| HOMEBUILT |  | Q40023 | 243 |
| HUGHES | 500 | W40018 | 198 |
| LAKE | LA4 | Q30058 | 160 |
| LUSCOMBE | 8 | P40013 | 122 |
|  |  | Q40015 | 171 |
| MARANDA | AMFS14 | A40001 | 233 |
| MOONEY | M20 | O30086 | 90 |
|  |  | Q40902 | 124 |
|  | M20J | O40011 | 58 |
| NA ROCKWELL | SBR60 | Q40901 | 101 |
| PIPER | J3 | C40033 | 181 |
|  | PA18 | C40013 | 56 |
|  |  | C40028 | 75 |
|  |  | P40014 | 173 |
|  |  | W30048 | 89 |
|  |  | W40032 | 178 |
|  | PA22TC | W40031 | 128 |
|  | PA23AZ | C30073 | 26 |
|  | PA24 | P40005 | 106 |
|  |  | W40901 | 130 |
|  | PA28 | C40036 | 43 |
|  |  | O40008 | 108 |
|  |  | Q40027 | 41 |
|  |  | W40025 | 36 |
|  | PA34 | C40907 | 153 |
|  |  | Q34069 | 47 |
|  | PA38 | A34008 | 28 |
|  |  | P40002 | 29 |
|  | PA44 | O40024 | 76 |

| MANUFACTURER | TYPE | REPORT NUMBER | PAGE (con't) |
|---|---|---|---|
| PITTS | S1 | O40019 | 246 |
| POLISH ACFT | PZLM18 | A44033 | 74 |
| ROCKWELL | 112 | O34910 | 94 |
| ROTORWAY | SCORPN | Q30054 | 219 |
| SAUNDERS | ST27 | A40011 | 5 |
| SIKORSKY | S58 | P40004 | 196 |
| SKYTREK | SKYSEE | O45004 | 238 |
| | | O45007 | 250 |
| | | P35004 | 213 |
| | | Q45001 | 232 |
| | | W35004 | 209 |
| | | W35006 | 211 |
| SMITH MINI | DSA 1 | O30057 | 224 |
| STINSON | 108 | O40017 | 120 |
| | | O40025 | 138 |
| | L5 | O40021 | 127 |
| STITS | SKYCPE | Q30061 | 222 |
| STRIPLIN | SKYRAN | W45004 | 239 |
| TAYLORCRAFT | B/B12 | C40039 | 155 |
| | | O40018 | 126 |
| TERRATORN | TIERRA | W45005 | 244 |
| ULTRAFLIGHT | LAZAIR | O35007 | 217 |
| | | O35014 | 226 |
| | | O45001 | 234 |
| | | O45003 | 237 |
| | | O45009 | 254 |
| | | P35013 | 223 |
| | | W35002 | 207 |
| | | W45001 | 229 |
| VISION | 20 | Q35007 | 215 |

Annex 2

## REPORTS BY PROVINCE/TERRITORY OF OCCURRENCES

| PROVINCE/TERRITORY | DATE | REPORT NUMBER | PAGE |
|---|---|---|---|
| Newfoundland & Labrador | 84 02 15 | A40002 | 169 |
| | 84 04 09 | A44017 | 203 |
| | 84 04 13 | A40802 | 60 |
| | 84 04 22 | A40005 | 63 |
| | 84 04 29 | A40006 | 66 |
| | 84 05 21 | A40009 | 177 |
| | 84 05 28 | A40011 | 5 |
| | 84 06 01 | A40012 | 22 |
| Nova Scotia | 84 02 18 | A40001 | 233 |
| | 84 04 14 | A44014 | 61 |
| | 84 04 27 | A44015 | 65 |
| | 84 06 14 | A40014 | 80 |
| New Brunswick | 83 06 29 | A34005 | 205 |
| | 83 08 11 | A34008 | 28 |
| | 84 04 12 | A40003 | 113 |
| | 84 05 13 | A40901 | 123 |
| | 84 05 18 | A40007 | 72 |
| | 84 05 26 | A44033 | 74 |
| | 84 06 10 | A40013 | 78 |
| Quebec | 83 02 18 | Q34012 | 25 |
| | 83 06 04 | Q35007 | 215 |
| | 83 06 14 | Q30037 | 45 |
| | 83 08 04 | Q30054 | 219 |
| | 83 08 14 | Q34064 | 159 |
| | 83 08 21 | Q35010 | 221 |
| | 83 08 23 | Q34069 | 47 |
| | 83 08 26 | Q30058 | 160 |
| | 83 09 05 | Q30061 | 222 |
| | 83 09 24 | Q30067 | 161 |
| | 83 11 14 | Q30077 | 228 |
| | 84 02 01 | Q44006 | 12 |
| | 84 02 06 | Q40007 | 13 |
| | 84 02 06 | Q40901 | 101 |
| | 84 02 16 | Q45001 | 232 |
| | 84 02 24 | Q40010 | 52 |
| | 84 03 28 | Q40012 | 32 |
| | 84 04 01 | Q40013 | 111 |
| | 84 04 11 | Q40015 | 171 |
| | 84 04 23 | Q40801 | 64 |
| | 84 04 23 | Q40802 | 117 |
| | 84 05 12 | Q40021 | 67 |
| | 84 05 15 | Q40902 | 124 |
| | 84 05 18 | Q40023 | 243 |
| | 84 06 03 | Q40026 | 140 |
| | 84 06 04 | Q40027 | 41 |
| | 84 06 05 | Q40028 | 141 |
| | 84 06 06 | Q40029 | 143 |
| | 84 06 11 | Q40033 | 182 |
| | 84 06 20 | Q40036 | 83 |

| PROVINCE/TERRITORY | DATE | REPORT NUMBER | PAGE (CON'T) |
|---|---|---|---|
| Ontario | 83 06 22 | O30045 | 46 |
|  | 83 07 09 | O35007 | 217 |
|  | 83 07 18 | C30073 | 26 |
|  | 83 09 11 | O30057 | 224 |
|  | 83 09 23 | O30086 | 90 |
|  | 83 09 25 | O35014 | 226 |
|  | 83 10 02 | O34910 | 94 |
|  | 83 11 30 | O34074 | 1 |
|  | 84 01 02 | C44001 | 11 |
|  | 84 01 06 | C40002 | 166 |
|  | 84 01 22 | O44006 | 31 |
|  | 84 01 22 | O44007 | 2 |
|  | 84 02 24 | C44006 | 103 |
|  | 84 02 24 | C45001 | 234 |
|  | 84 02 28 | C40015 | 170 |
|  | 84 03 06 | C40013 | 56 |
|  | 84 03 07 | O40008 | 108 |
|  | 84 03 26 | O40011 | 58 |
|  | 84 04 07 | O45003 | 237 |
|  | 84 04 11 | O40014 | 192 |
|  | 84 04 11 | O45004 | 238 |
|  | 84 04 18 | O44022 | 4 |
|  | 84 04 21 | O40015 | 116 |
|  | 84 04 22 | O40016 | 38 |
|  | 84 04 28 | O40802 | 39 |
|  | 84 04 29 | O40017 | 120 |
|  | 84 05 13 | C40024 | 242 |
|  | 84 05 14 | C40025 | 68 |
|  | 84 05 15 | C44021 | 70 |
|  | 84 05 18 | O40022 | 174 |
|  | 84 05 20 | O40018 | 126 |
|  | 84 05 21 | O40019 | 246 |
|  | 84 05 21 | O40021 | 127 |
|  | 84 05 27 | O45006 | 247 |
|  | 84 05 31 | C40028 | 75 |
|  | 84 05 31 | O40024 | 76 |
|  | 84 06 02 | O40025 | 138 |
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